1. Improving the fiscal situation will play an important role in ensuring inclusive growth in India. Do you agree? Substantiate.

Introduction

Inclusive growth refers to the economic growth that is distributed fairly across the society and creates opportunities for all. In Indian context, stark economic inequalities necessitate fiscal actions for ensuring inclusive growth.

Body

Fiscal situation and Inclusive growth

1. Many economists argue that fiscal deficit promotes growth as it stimulates demand. It boosts inclusive growth as it includes increasing public expenditure on the poor as well as on education and health.
2. Active public expenditure policies to increase consumption of the poor are also seen as more effective in promoting inclusive growth as poor have high propensity to spend which has a multiplier effect on the entire economy.
3. Further, due to limitations of impact of monetary policy in fostering broad based growth, the burden of growth stimulation falls on fiscal policy.
4. At the same time, it is important to consider the negative consequences of a bulging fiscal deficit like crowding out effect, higher interest rates, low public savings, highest inflation and increase in taxes.

These factors impact the prospects of inclusive growth adversely thus necessitating **fiscal prudence.** Fiscal prudence can help in achieving the goals of inclusive growth in following manner-

1. Reduced fiscal deficit will help in achieving the goals of Fiscal Responsibility and Budget Management Act, 2003 (FRBM act) thus improving macroeconomic stability. Recent reduction of Fiscal Deficit target to 3.3% of GDP from earlier announced 3.4% is a step in this direction.
2. Unchanged gross market borrowings and increased reliance on overseas markets for borrowings, as announced recently, has helped in maintaining fiscal discipline.
3. Increased returns from disinvestments and dividends from RBI/financial institutions has improved funds transfer to programs like PMAY and social sector schemes.
4. Multipronged efforts in this regard have helped in job creation and augmenting of incomes.

The fiscal space created due to responsible expenditure and creative revenue generation policies have led to increased investment targets towards sector's like infrastructure(PMAY, Bharatmala and Sagarmala projects, UDAN, etc.), education(Samagra shiksha, RISE, etc.) and health(Ayushman Bharat) along with simplification of labor laws which is giving an inclusive character to Indian growth story.

At the same time, recent slowdown in growth has impacted government expenditure where compression of government spending has been an important driver of sharp decline in economic growth. Such a slowdown has also impacted the prospects of inclusive growth as lack of overall economic growth hampers consumption and investment cycles.

Way Forward:

1. Fiscal reforms to create enough fiscal space to increase pro-poor spending and revive growth.
2. Fixing GSTN to avoid revenue shortfall as it has been a major stumbling block in realization of GST revenues.
3. Extending PM-KISAN type income support scheme to all citizens through initial rationalization of subsidies.
4. Increasing education, health and infrastructure spending by around 1% of GDP each.
5. Decreasing tax exemptions towards one's whose public benefit is unclear.

Conclusion

Following increasingly prudent fiscal policies, as can be seen from recent budget, combined with a focus on rural economy, MSME sector, affordable housing and other related sectors can help render the Indian growth story more inclusive.

2. What are your views on the level of tax compliance in India? What measures have been taken by the government to increase tax compliance? Discuss

Introduction

Increasing tax compliance is a constant worry of tax authorities around the world and this is more pronounced for developing countries like **India** that seek to achieve numerous social and economic objectives through tax collection and incentives.

Body

Tax Compliance in India:

- Tax structure in India is divided into direct and indirect taxes where direct taxes are levied on taxable income earned by individuals and corporate entities while indirect taxes are levied on the sale and provision of goods and services.
- Every taxpayer is required to undertake certain compliances like Annual filing of return of income, report of audit under the Income Tax Act, etc.
- Historically, the rate of tax compliance is low in India with only 36% of all individual taxpayers in organized and unorganized sector filing tax returns (Finance Minister). But recent data shows this at an even low level of 11.6% among individual taxpayers.

- Further, only 1.5% of Indians pay income tax out of which there are large disparities within the taxpayers too as the bottom 23% of the income tax is contributed by 93% of the taxpayers. This reflects at the macroeconomic level where India has a low tax to GDP ratio.
- Recent data further throws light on the low compliance rates where less than 50% of Doctors pay taxes and only 1/3 rd. of the CA's pay taxes.

Measures by Government to increase tax compliance:

Age old wisdom of Chanakya needs to guide the tax collection and compliance in India where he opined that taxes should be collected like bees collecting honey i.e in the right amount and without inflicting pain. Such an ideal would help in improving tax compliance and government has undertaken following measures to make India a tax compliant society:

1. **Demonetization** - the act of stripping a currency unit of its status as legal tender which was undertaken to combat tax evasion via 'black money' held outside the formal economy. It helped in increasing formalization of the economy and the consequent scrutinizing of bank deposits.
2. **Goods and Services Tax** - introduction of GST in 2017 has been termed as one of the biggest indirect tax reforms in the country. It is a comprehensive multistage, destination based tax which follows a dual model. This has helped in reducing compliance costs considerably.
3. **PAN-Aadhaar Linkage** - has helped in getting rid of fake PAN cards, identify tax evaders, curb black money circulation and make it easy for Taxpayers to file returns. Further, legitimacy of returns has also been improved due to foolproof authentication and verification procedures incorporated.
4. **Project Insight** - a tax tracker based on big data where the government will put to use a range of non-traditional but effective sources of information to help tackle tax evasion and avoidance. This is inspired from the 'Connect' program of the United Kingdom.
5. **Form 26AS changes** - the annual consolidated tax statement which is based on PAN which has helped in simplification of tax procedures and compliance.
6. **Digitalization** - promotion of digital transactions and increasing formalization of economy have helped in reducing the possibilities of hiding income. Further, tech interventions have helped taxpayer's in easing compliance and assessments.
7. **Behavioral economics** - incorporation of behavioral economics and employing social norms to nudge individuals to pay their taxes has helped improve compliance. Large Scale advertisements by CBDT are efforts in this direction.
8. **Rationalization measures** - incorporated through the 2018-19 budget have empowered agencies and enforcement authorities towards greater scrutinizing powers which have helped in better compliance.

These measures along multi- sectorial efforts on part of government are helping towards the goal of making India a tax compliant society from a non-tax compliant society.

Conclusion

A healthy functioning economy is based on equal participation of all stakeholders where law-abiding entities are favored towards the goal of making India a low tax rate, high tax compliance nation where each person pays a moderate rate of tax.

3. Examine the significance of an effective exit policy in the greater discourse of liberalization in India. What measures have been taken by the government on this front? Are they effective? Critically examine.

Introduction

The introduction of reforms in India and the consequent liberalization of the economy has exposed the entrepreneurs to an ever increasing competition. One of the important sets of policy measures since then relates to reforms in the labor sector of which the EXIT policy remains unaddressed.

Body

- The term 'exit' means the right of an industrial unit to close down. Exit policy means the policy regarding the retrenchment of the surplus labor force resulting from restructuring of industrial units and workers displaced by the closure of sick units.
- Exit may become necessary due to strategic reasons, financial constraints and environmental changes. Therefore, exit policy refers to the policy concerned with the action to be taken regarding surplus manpower in companies, owing to a variety of reasons, such as, restructuring, retrenchment, closure, or technological developments.
- The significance of an effective exit policy in India is due to the following factors:

1. Closure of sick units would be beneficial for the country's economy. Banks, financial institutions, state governments and the central government would be freed from the burden of providing incentives, subsidies and other concessions to keep the sick units going, the resources so saved can be invested for the growth of healthy units.
2. An exit policy will ensure that the legitimate dues of displaced workers are paid to them speedily and satisfactorily. Without such a policy, these workers have to lose their dues.
3. Closure of sick units may cause temporary unemployment. But the investment made out of the sale proceeds would create permanent employment.
4. Maintenance of sick units provides more benefit to inefficient and corrupt employers responsible for sickness than to the workers.
5. Sick units will ultimately close down exit policy or no exit policy.

6. Several countries such as Singapore, Malaysia, Thailand and Indonesia have carried out economic reforms with exit policies. The result of such policies has been encouraging. A similar policy would be beneficial for India.
7. Integration of an economy with the world economy would be incomplete without an exit policy. Indian companies would face a competitive disadvantage in the absence of freedom to retrench surplus labor.
8. In the absence of an exit policy, labor is the biggest loser. The legitimate interests of workers are protected, only when there is a legal closure of a sick unit.

A well-laid out exit route should be provided both in the interest of workers and the economy. Some of the measures introduced with regards to Exit policy in India include:

1. Voluntary Retirement Scheme (VRS)- The most important measure is the introduction of Voluntary Retirement Scheme(VRS). It is the most humane technique to provide overall reduction in the existing strength of the employees. It is also known as 'Golden Handshake' as it is the golden route to retrenchment.
2. National Renewal Fund (NRF) - The government of India created this fund on February 4, 1992 to provide a safety net for labor. The fund would provide assistance for retraining and redeployment of labor arising as a result of modernization and technology up gradation and also provide compensation to workers.
3. Scheme of Counselling, Retraining and Redeployment (CRR) of rationalized employees of Central Public Sector Undertakings (CPSUs)- The objective and scope of the scheme is to provide opportunities of counselling, retraining and redeployment to the rationalized employees of Central Public Sector Enterprises (CPSEs) rendered redundant as a result of modernization, technology up gradation and manpower restructuring in the Central PSEs.
4. Insolvency and Bankruptcy Code 2016- The RBI is using this to force banks to get tough with defaulting promoters, forcing them to sell assets to repay debts and make their companies solvent. This is a revolutionary change.

- The larger question of effectiveness of these measures is muddled due to procedural deficiencies, bureaucratic red-tapism as well as legacy of the license permit raj system.
- IBC has been a welcome exception where-in larger insolvency proceedings have been effective while the issues of small and medium entities remain thus affecting the Exit mechanism and labor issues.
- At the same time, it is important to note that Exit policy is not the ideal remedy for tackling industrial sickness. It may benefit employers as they siphon off funds from old units to newer ones.
- To minimize the adverse effects of closure of a unit on labor, several options like social security nets, insurance schemes and other employee benefit schemes have been in place which have been successful to an extent.

Conclusion

There is no specific policy or law dealing with exit, and the actions are governed under the existing laws and regulations as and where they are applicable. However, the exit policy is gradually coming under formation and informed opinion is that a time may come when there will be adequate political will to enact and implement it.

4. What are the challenges in developing world class port infrastructure in India? What measures have been taken by the government to upgrade the ports? Discuss.

Introduction

India has an extensive 7,500 km coastline with 12 major ports and just under 200 minor ports, of which 139 are functioning. Primarily, the major ports deal with, by volume, 95% of India's total foreign trade. But, across the board, these ports are underperforming because of serious infrastructure and connectivity problems.

Body

According to the NITI AAYOG, to achieve the ambitious target of having a 5% share in world exports and climb up the ranks in ease of doing business, India needs to address its port ecosystem. Also Port infrastructure forms a key part of the trade infrastructure.

In this regard, the challenges facing in development of a world class port infrastructure include the following:

1. **Issues with PPP Model-** Most port PPPs impose strict limits on what private operators are allowed to do, usually in terms of the types of cargo they are allowed to handle.
2. **Limited Hinterland Linkages-** Inefficiency due to poor hinterland connectivity through rail, road, highways, coastal shipping and inland waterways.
3. **Incoherent Policy Measures** - Port Infrastructure has been a neglected space in terms of policy focus due to multiple factors.
4. **Sub-optimal Transport Modal Mix** - Lack of requisite infrastructure for evacuation from major and non-major ports leads to suboptimal transport modal mix.
5. Lack of adequate berthing facility, number of berths, sufficient length for proper berthing of the vessels at the Non-Major Ports is another problem.
6. Processes and operations across India's ports are not standardized or uniform, costs and time for key processes are unpredictable and there is an unacceptable level of variation across ports as well as within ports.

7. **Financial constraints** - Years of underinvestment have left the port infrastructure in dismal condition especially with regards to the non-major ports.
8. **Deficient dredging capacity** - Draft is also a major limitation in India as terminals and ports are unable to cater to vessels beyond Panamax (Draft over 13 meters) size that are increasingly dominating global trade.
9. Land acquisition and environmental clearances are some specific challenges for port infrastructure.

Due to India's inadequate port infrastructure, many investors are wary of getting involved in business in the region and also hampers the overall economic prospects, to overcome which government has taken the following measures as well as to usher in the ideal of port led development :

1. In 2016, India passed the Central Port Authority (CPA) Act. The act grants more autonomy to the major ports.
2. The Revised Model Concession Agreement (MCA) was released in 2016, which includes incentives for the private sector to get involved with the ports through updated tariff guidelines and discounted revenue shares.
3. The government provides a 10-year-tax holiday to companies that help maintain and operate ports. If these companies undertake a port development project, the government will help with up to 50% of the cost.
4. Sagarmala Project: The programme aims to modernize India's ports so that port-led development can be augmented and coastlines can be developed to contribute to India's growth. Port Modernization & New Port Development, Port Connectivity Enhancement, Port-linked Industrialization and Coastal Community Development form the component of this Project.
5. Project Unnati: It has been started by the Government of India to identify the opportunity areas for improvement in the operations of major ports.
6. Introduction of Port Enterprise Business System - A was tender issued by the Indian Ports Association (IPA) to maintain an Enterprise Business System (EBS) to modernize and automate port processes for five central government-owned ports.

Way Forward:

- Priority should be given on expanding capacity and improving operational efficiency.
- Environmental clearances, Tariff norms, land acquisition etc. need to be standardized and implemented for the port sector so as to boost foreign investments.
- The regulatory regime should be made less complex and less rigid.

Conclusion

India’s cargo traffic handled by ports is expected to reach 1,695 million metric tons by 2021-22, according to a report of the National Transport Development Policy Committee and to capitalize on this potential, expedient development of port

infrastructure becomes vital which will further help in realizing the dream of $5 trillion economy by 2024.

5. What do you understand by the 'intensity' and 'productivity' of agriculture? In the Indian context, explain the significance of intensive cultivation and suggest measures to improve the productivity of cultivation.

Introduction

India's economic security continues to be predicated upon the agriculture sector where agriculture supports 50% of the population, as against about 75% at the time of independence. In the same period, the contribution of agriculture and the allied sector to the Gross Domestic Product (GDP) has fallen from 61 to 17%. Such a scenario has been due to the condition of 'intensity' and 'productivity' of agriculture in India

Body

- Cropping intensity refers to raising of a number of crops from the same field during one agricultural year; it can be expressed through a formula- Cropping Intensity = Gross Cropped Area / Net Sown Area x 100
- Thus, higher cropping intensity means that a higher proportion of the net sown area is being cropped more than once during one agricultural year. This also implies higher productivity per unit of arable land during one agricultural year.
- Productivity of Agriculture is defined as the amount of crops produced per unit land. It can be expressed in formulaic form as- Agriculture productivity = Total agriculture crop production/Total land area
- Productivity levels in Indian agriculture are very low as compared to the productivity levels of other countries. In terms of global rank, the productivity levels of India in major agricultural crops is very disappointing.

At the same time, Intensive farming is associated with the increasing use of labor, high yielding varieties of crops, chemical and natural fertilizers, insecticides, pesticides and irrigation. The significance of intensive cultivation in India can be seen from the following points:

1. **Population of India-** The extreme population pressure necessitates employing intensive cultivation on a large scale. (2011 census - 1.21 billion population of India)
2. **Land Fragmentation**- Average land holding size has been constantly on decline in India

Table 3: Productivity of Land in Some Countres (2002) (100 kgs per hectare)

Crop	Productivity	Crop	Productivity
Wheat		*Seed Cotton*	
U.K.	80.4	China	39.8
France	74.5	U.S.A.	19.0
China	38.9	Pakistan	18.7
India	27.7	India	7.5

Crop	Productivity	Crop	Productivity
Rice (Paddy)		*Groundnut (in shell)*	
U.S.A.	73.7	U.S.A.	28.7
Japan	65.8	China	29.9
China	62.7	Argentina	23.3
India	29.1	India	7.6

since independence with 1.1 hectare being the present average land holding size.

3. **Crop rotation and mixed cropping**- Intensive cultivation helps in the suitable arrangement of successive crops in such a way that the different crops draw nutrients in different proportions or from different strata. Mixed cropping helps in a similar manner.
4. **Use of Fast Maturing Varieties**- These varieties can enable growing of more than one -crop within one growing season.
5. **Appropriate Plant Protection-** Intensive cultivation helps in measures to use of pesticides and insecticides, seed treatment, weed control, rodent control measures, etc. These measures are effective when all the farmers in an area take these up collectively.
6. **Substantial Improvement in Yield**- can be attained through soil improvement measures, such as land leveling, sloping, contour bunding, terracing, removal of salinity and alkalinity, etc.
7. **Others**- Agricultural intensity could also be important with regards to animal husbandry and fishery supplementing or complementing the crops grown.

Present scenario of Indian agriculture makes intensive agriculture an important part of the agriculture growth story but it would be incomplete without commensurate improvements in the productivity of cultivation. Consequently, following measures can be considered to improve the productivity of cultivation in India:

1. Proper Implementation of **Land Reforms**- Proper implementation of land reforms and land tenure system can bring up the productivity rate of Indian agriculture.
2. **Proper Education-** Positive efforts have been taken by the government to educate the illiterate poor farmers about the new methods of technical farming.
3. **Adequate Land Water Resources-** 329 million hectares of land is degraded in India. Hence an integrated and efficient management of our land is very necessary.
4. **Package Programme**- Proper implementation of 'Package Programme (i.e. irrigation, high yielding variety seeds chemical fertilizers, modern machineries etc. is necessary to increase the productivity of the soil.
5. **Crop Protection**- According to agricultural scientists in India nearly 5% of the total crop production is destroyed by different insects, pests and diseases. Maximum farmers are ignorant about the use of insecticides and pesticides.
6. **Research and Development**- Government of India made Indian Council of Agricultural Research and several Agricultural Universities to organize several research and development programmes for the improvement of cultivation.
7. Focus on **Information and Communication Technology (ICT)**- enabled extension services, which play a crucial role in supporting agricultural activities by taking research, technology and know-how to farmers to improve adoption.
8. **Soil and Seeds**- Improving soil health and considering improving the availability of certified seeds can help productivity improvement measures.

Conclusion

Improving agricultural productivity is important in order to improve farmer incomes. Also the phenomenal benefits of focusing on improving intensity of agriculture highlight the need to prioritize policies that will achieve the most for farmers. Such a multi-pronged effort can help in achieving the goal of doubling farmers' income by 2022.

6. Institutional and procedural reforms alone won't address the problems of agricultural marketing in India. Do you agree? Substantiate.

Introduction

Farmers in India are largely unrelieved of their incessant problems. The most pressing problems facing the Indian farmer are the persistently low market prices. From onions to potatoes and pulses to oilseeds, prices of most crops are much below expectations and normal trends. Farmers are hardly empowered to decide price of their product.

Body

Problems of agricultural marketing in India:

- Low share of farmer: The Dalwai Committee on Doubling Farmers' Income has pointed out that the share of farmers in consumer's price is very low; it generally varies from 15 to 40 per cent.
- Lack of ware housing and storage: Cold storage units exist in less than one-tenth of the markets. Post-harvest losses of various commodities ranged from 6 to 18 per cent.
- Lack of transportation facilities: Almost 40 per cent of all fruits and vegetables are lost annually in India between the grower and the consumer mainly due to lack of storage facilities, a weak transportation system and bad roads.
- Lack of Uniformity in grading and standardisation: Open auction platforms exist only in two-thirds of the regulated markets. Grading facilities in less than one-third; electronic weigh-bridges are available only in a few markets.
- Lack of Market information.
- Inadequate research on marketing.

Problems of APMC Act:

- Market Segmentation: The monopoly of APMCs in agriculture market reduces buyer competition in comparison to integrated markets, as it limits the geographical range of the mandis, number of buyers and sector specialization of buyers.
- High Degree of Intermediation and Cartelization: Missing credit markets so farmers borrow from intermediaries, conditional to sale of harvest. Cartelization by traders prevents price discovery mechanisms from functioning in mandis.

- High License fees and Taxes: High commission levied on both farmers and buyers create artificial inflation. Final price to consumer high but benefit does not reach the farmer.

Institutional and procedural reforms:

- Model APMC act: Despite of being the state subject central government has brought model APMC act to empower farmer to sell his product outside APMC.
- E-NAM: It is virtual market but it has a physical market (mandi) at the back end. E-NAM creates a unified market through online trading platform both, at State and National level and promotes uniformity.
- Minimum support price: Govt assured farmers MSP almost 150% of input cost and announced 5% to 7% increase in the MSP for winter season recently.
- Price stabilization fund: The scheme provides for maintaining a strategic buffer of commodities for subsequent calibrated release to moderate price volatility and discourages hoarding and unscrupulous speculation.

Along with Operation Green, Agriculture market infrastructure fund, Agriculture Marketing and farmer friendly index are major steps towards institutional and procedural reforms in agricultural market.

However considering the urgency of agricultural market reforms, there is need to apply innovative measures along with institutional and procedural reforms.
Need of new thinking:

- Agriculture marketing can moved to union list or concurrent list to push reforms as only handful of states like Bihar, Maharashtra broke the monopoly of APMC markets.
- Farmer-Consumer Market: There is need to squeeze intermediary share if not eliminate. Farmer- consumer markets specially reserved for farmers may prove solution for both inflation of food prices and remunerative price.
- Ware house based sale.
- Reduction input cost of farming could also solve the issue of agricultural pricing.
- Innovative ways to reduce dependence on fluctuations in agriculture pricing, there is a need for the farmers contributing in solar energy generation, participation in wind energy, installing solar panels in his farms, etc and also to become an Urjadaata from Annadata.

Conclusion

Climate change and weakening of WTO led system of Agriculture trade created new challenges for agriculture marketing in light of which agricultural marketing services have to be strengthened. There is need to bring information decimation and increased awareness among farmers for maximum benefits.

7. There are many affluent farmers in the country who are earning in crores from modern farming. However, they are exempt from paying the income tax. What are

your views on this? Shouldn't big and affluent farmers be brought under the net of income tax? Substantiate your views.

Introduction

Comptroller and Auditor General of India (CAG) called for greater efforts to check tax evasion through claims of tax exemption on farm income in audit report of the revenue department. Earlier NITI Aayog proposed the idea to tax agricultural income beyond certain threshold. It has been remained issue of debate in India whether agricultural income should be taxed or not.

Body

There is no theoretical justification for the continued exemption from the income tax of income derived from agriculture. However, there are administrative and political objections to the removal of the exemption at the present time. It is very sensitive issue as very idea of taxing agriculture income may prove political suicide for popular leadership of political party.

There is need to bring big and affluent farmers in the net of income tax as agricultural income exemption has become loophole for tax exemption and generation of black money. The exemption for agricultural incomes is benefiting rich farmers and agricultural companies, which was not the intended outcome.

- Evasion through Exemptions: Tax exemption was granted in hundreds of cases where land records were not available or proof of farm income was not available in terms of ledger account or invoices.
- Absence of targeted benefits: In assessment year 2014-15, nine of the top 10 claimants for tax exemption of agricultural income were corporations; the 10th was a state government department.
- Money Laundering: Tax Administration Reform Commission report of 2014 points out, Agricultural income of non-agriculturists is being increasingly used as a conduit to avoid tax and for laundering funds, resulting in leakage to the tune of crores in revenue annually.
- Political courage already evident as six states currently have agricultural tax legislation on the books—Tamil Nadu, Kerala, Assam, Bihar, Odisha and West Bengal—even if implementation varies substantially, from taxes not being levied at all to being levied only upon income from plantations.
- Those who own more than 4 hectares of land form just 4% of the total agricultural households but hold over 20% of agricultural income. Just by taxing the incomes of the top 4.1% of agricultural households, at an average of 30%, as much as Rs 25,000 crore could be collected as agricultural tax.
- There is need to move beyond a reflexive rejection of the very concept of agricultural tax.

However, the road to taxing agricultural income is not easy due to various reasons such as,

- From a Constitutional standpoint, only the states are entitled to levy this tax.

- Extent of the informality that still exists in the agricultural sector, implementation of an agricultural tax would admittedly not be easy as concerns about accuracy and flexibility of crop specific prices and income with geographical variation.
- Agriculture sector is already facing crisis due to various reasons like indebtedness, uncertainty of rainfall due to climate change, pest attacks due to increasing microbial resistance almost 2000 farmer commit suicide every year in India.
- Centre for Study of Developing Societies (CSDS), study report, "State of Indian Farmers" says that 76 per cent farmers would prefer to do some work other than farming. Sixty-one per cent of these farmers would prefer to be employed in cities because of better education, health and employment avenues.
- The very thought of taxing agriculture income could demoralize farmers and further weaken their resolve to continue subsistence farming activity as 70% of agricultural households in India have marginal holdings (under 1 hectare).
- The focus should on increasing farmer's income rather than taxing meagre income from agriculture.

There is need to find prudent path as India has very low tax to GDP ratio.

- It would be to amend the definition of 'agricultural income' under the tax laws, and impose an appropriate monetary threshold after careful deliberation and study. Income that is not covered by this revised definition can then be subject to income tax. This would ensure that only the high-income farmers come under the purview of taxation, and the interest of small scale and mid-scale farmers is protected.
- Another alternative is for the parliament to formulate a model law for the states to adopt, with a reasonable threshold and slab rates, much like income tax, to tax agricultural income.

However, there can be no easy answer to the question of whether agriculture income should be taxed, as it would have far reaching implications, as well as technical and legal challenges.

Conclusion

It's important to find the right balance between the taxing agricultural income and avoiding disincentivising the agriculture sector. The current focus of the government to bring farmers under the formal system by promoting digital economy is a step in the right direction.

8. What role can technology play in addressing the challenges of food security in India? Illustrate.

Introduction

Food security will remain a worldwide concern for some time in future. In words of FAO, 'food Security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.'

Body

There has been no significant jump in crop yield in many areas stressing the need for higher investments in research and infrastructure, as well as addressing the issue of water scarcity.

Challenges of food security:

- Availability of food grains at affordable price: Total food grain production in India is estimated at 281.37 million tonnes during 2018-19. Considering the continuous increase in the population of India, will require 333MT of food grains by 2050 to maintain food security. Land and water resources are limited hence remains one of the major challenge.
- Crop diversification: It reduced the area under food grains and pulses where as there is increase in area under the fruits, vegetables and oil seeds.
- Climate change: Climate change is a crucial factor affecting food security in many regions including India. The changing climate will influence the food grain production in different ways. For example, deficit rainfall or flooding. Similarly, extreme high or low temperatures result in variations in the length of crop growing season.
- Land and Water resource Utilization: The mismatch between the expanding demand for and supply of water emerging and spreading steadily over space and time.
- Dietary Patterns: It was reported that ever increasing human population coupled with their changing dietary preferences significantly increased global demand for food and thereby generating tremendous pressure on native vegetation and ecosystems.
- Bio fuels and Medicinal plants: One of the main reasons for food security crisis at global level is the diversion of agricultural lands that were used for cultivating maize and wheat to bio-fuel and medicinal plants.

Role of technology for food security in India:
One of the best ways to ensure food security in future is investing in new technologies that enable farmers to connect with information and institutions that can decrease uncertainty and mitigate risk.

- Connectivity and Information decimation: The Gramin Krishi Mausam Seva of Earth System Science Organization-Indian Meteorological Department has been successful in providing the crop specific advisories to the farmers through different print/visual/Radio/IT based media including short message service (SMS) and Interactive Voice Response Service (IVRS) facilitating for appropriate field level actions.
- Alert and real time weather forecast: Promotion of conservation farming and dry land agriculture, with each village provided with timely rainfall forecasts,

along with weather-based forewarnings regarding crop pests and epidemics in various seasons, is necessary. With adoption of drought-tolerant breeds that could reduce production risks by up to 50%.

- Government initiatives: Krishi Vigyan Kendra organizes programs to show the efficacy of new technologies on farmer fields. It tests seed varieties or innovative farming methods, developed by ICAR institutes. This allows new technologies to be tested at the local level before being transferred to farmers.
- GM crops to increase production: Genetically modified organisms, or GMOs, are another important innovation in helping to increase agricultural productivity and to meet food demand.
- Secure seeds and fertilisers: The concepts of integrated nutrient management and integrated pest management have attained significance in the context of sustaining soil fertility and environmental protection. However, the realization of crop yields may take longer under these sustainable agricultural technologies.
- Geo tagging of rural infrastructure projects will help to reduce the corruption and in way money can be used for increasing production and ensure food security.
- Financial inclusion of farmers via JAM trinity: Enabling the quick and secure transfer of funds, mobile-banking services allow producers to access markets more efficiently, reduce their transaction costs, and tap into higher-value market sectors.
- The options for combining crop component with animal component such as integrated rice-fish farming may be explored which would result in additional net returns to the farmers without affecting the food security.

Conclusion

Global Hunger Index of 2019, India ranked 102nd out of 117 countries and this report is quite disturbing because India is one of the largest producers of food in the world. To achieve Sustainable development goal of ending hunger by 2030, food security in India can be achieved by paying higher attention to technology driven solutions with farmer as central pivot.

9. Examine the current status, prospects and challenges associated with the export of livestock products from India.

Introduction

Animal Products plays an important role in the socio- economic life of India. It ensures food security, provides employment, which leads to reduction in poverty and one the major source of protein intake. Livestock product export gains significance for doubling farmer's income by 2022.

Body

India has emerged as the largest producer of milk with 20.17 percent share in total milk production in the world. India accounts for about 5.65 percent of the global egg production and also the largest population of mulch animals in the world.
Current status of livestock product exports:

- India's export of Livestock Products was Rs. 30,632.81 Crores which include the major livestock products like Buffalo Meat (Rs. 25168.31 Crores), Sheep and Goat Meat (Rs. 790.65 Crores), Poultry Products (Rs. 687.31 Crores) according to data on APEDA.
- Even though, India's buffalo meat exports fell 8.7 percent in 2018-19 from a year ago to the lowest level in six years still India is the world's biggest exporter of buffalo meat.
- India's Export of Dairy products was 1.13 lac MT to the world, major export locations were Turkey, UAE, Egypt, Bangladesh.
- Leather sector is known for its consistency in high export earnings and it is among the top ten foreign exchange earners for the Country.
- The export of footwear, leather and leather products from India reached a value of US$ 5.69 billion during 2018-19.
- India's seafood export earned Rs 45,106.89 crore in 2017-18 with frozen shrimp and fish continuing to dominate the export basket.
- Wool exports (woolen yarn, fabrics, and made ups) stood at US$ 185.96 million during 2017-18 and US$ 120.36 million between Apr-Oct 2018.

Prospects livestock product exports:

- The demand for Indian buffalo meat in international market has sparked a sudden increase in the meat exports. Buffalo meat dominated the exports with a contribution of over 89.08% in total Animal Products export from India.
- In the 2018 Budget, the Department of Animal Husbandry made a provision to allocate $383 million for establishment of an 'Animal Husbandry Infrastructure Development Fund'. The fund supports small and marginal farmers, including entrepreneurs, by helping to get better remuneration for their produce by meeting their working capital requirement to modernize or set-up a new infrastructure.
- Creation of 'Dairy Processing and Infrastructure Development Fund' with a net outlay of $1.5 billion to benefit 9.5 million farmers in about 50,000 villages.
- National Dairy Plan (NDP) phase-1 through the National Dairy Development Board for breed improvement, artificial insemination, and fodder development.
- Creation of a special Fisheries and Aquaculture Infrastructure Development Fund is in pipeline; the fish production target is 15 MMT by 2020 and 20 MMT by March 2023.

Challenges associated with livestock product exports:

- Though, Supreme Court suspended the nationwide ban on sale of cattle for slaughter, revival of the idea might hurt the livestock sector.

- Government decided to ban the export of livestock from all sea ports in the country for an indefinite period at a time when the export of livestock from India has boomed from Rs 69.30 crore in 2013-14 to Rs 527.40 crore in 2016-17.
- China, which accounts for more than half of Indian shipments of buffalo meat, has been buying less in the last few months.
- There are concerns raised by China over foot and mouth disease infection among Indian buffalos.
- Indiscriminate and extensive use of antibiotics in poultry rearing needs to be strictly monitored to reduce the incidence of drug resistance in the food web. There are allegations on poultry sector of for spreading superbugs in the world.
- India decided to stay out of RCEP but free trade agreement with countries like New Zealand could have threatened India's dairy sector.

Conclusion

There is need to develop dedicated institutional mechanism for pursuing market access, tackling barriers and dealing with sanitary and phytosanitary issues and strive to double India's share in world livestock product export by integrating with global value chains. Farmers should get benefit of export opportunities in overseas market.

10. Do you think a National Land Use Policy should be formulated urgently? Substantiate your views.

Introduction

The National Land Use Policy is necessary to achieve improvement of livelihood, food and water security, and best possible realization of various developmental targets so as to ensure sustainable development of India. There was draft National land utilization policy formed in 2013.

Body

To ensure optimal utilization of the limited land resources in India for addressing social, economic and environmental considerations and to provide a framework for the States to formulate their respective land utilization policies incorporating state specific concerns and priorities.

Necessity of National Land Use Policy:

- Unregulated land use shifts: the net sown areas in the country have increased from 41.8% to almost 51%, the forest areas have increased from 14.2% to almost 23%, and the areas under non-agriculture uses, which include industrial complexes, transport network, mining, heritage sites, water bodies and urban and rural settlements has also increased, since 1950. These increases of land use as above have led to reduction of land use elsewhere.

During the same period, the "other areas" that include barren & un-cultivable land, other uncultivated land excluding fallow land and fallow lands have drastically decreased by nearly half.

- Reduction in per capita uses of land resources: Protection of agricultural lands from land use conversions so as to ensure food security and to meet consumption needs of a growing population and to meet livelihood needs of the dependent population.
- Urbanization demands: According to the world population prospects by the United Nations, 55% population of India will be urban by the year 2050. The demand for non-farm land use will increase further in future. There is a need for appropriate land utilization and management strategy and land use planning to cater to the growing urbanization needs. There is scope for re-densification, proper augmentation of land under municipal corporations, PSUs.
- Meeting industrialization demands: The industrial development occupies a lot of land. The industrial development is associated with supportive development which also requires considerable amounts of land.
- Protection of social interests: To identify and protect lands that are required to promote and support social development, particularly of tribal communities and poor section of society for their livelihood.
- Protection of heritage: To preserve historic and cultural heritage by protecting, places/sites of religious, archaeological, scenic and tourist importance.
- Protecting lands under natural resources and ecosystem services: To preserve and conserve lands under important environmental functions such as those declared as National Parks, Wild Life Sanctuaries, Reserved Forests, Eco Sensitive Zones, etc. and guide land uses. To preserve the areas of natural environment and its resources that provides ecosystem services.

As there is continuous stress on land resource in India as around 17% of world population has only 2.4% of world land area.

- Nearly 30% of its land area in India, as much as the area of Rajasthan, Madhya Pradesh and Maharashtra put together, has been degraded through deforestation, over-cultivation, soil erosion and depletion of wetlands.
- This land loss is not only whittling away India's gross domestic product by 2.5% every year and affecting its crop yield, but also exacerbating climate change events in the country which, in turn, are causing even greater degradation.
- Recognition of the customary tenure of indigenous people who have knowledge about local ecosystems like forests, and involving them in the decision-making and governance can help advance the efforts against climate change. "Insecure land tenure affects the ability of people and communities" to fight climate change, said the IPCC report.
- An ongoing case in the Supreme Court of India also threatens to evict 2 million forest dweller families whose Forest Rights claims have been rejected. Currently, 21 state governments are in the process of reviewing all the rejected claims.

- Land pollution due to excessive use of chemical fertilisers, biocides (pesticides, insecticides and herbicides), polluted liquids and solids from urban and industrial areas, forest fires, water-logging and related capillary processes, leaching, drought.

Detailed National land utilization policy could help to do away all aforementioned issues regarding land use in India.

Conclusion

There is urgent need to formulate National land use policy with perspective of 'New India' to minimize land use conflicts or negative environmental impacts. For implementation of land utilization policy, all concerned at different levels, viz. national, state, regional and local should suggest a general implementation framework and undertake capacity building.

11. How are reusable rockets changing the space exploration industry? Illustrate.

Introduction

The space industry is in the middle of a widespread transformation, as the last decade has seen a number of young companies begin to seek to profit through development of a reusable launch system. Today's rockets are one shot wonders. They burn up fuel in a few minutes and splash down into terrestrial oceans, having put their payload on the right trajectory. This is wasteful and that is why scientists have dreamt of building reusable launch vehicles which would help in future space exploration.

Body

- The holy grail of rocket launchers is a concept referred to as the single stage to orbit (SSTO) vehicle. The idea is to use a reusable launch vehicle (RLV) which has the capability to deliver a payload to orbit, re-enter the Earth's atmosphere and land, where it can then be refuelled. The process can then be repeated with a short turnaround.
- Reusable launch vehicles reduce cost by allowing space agencies to shave off the expense of the recovered stage for every subsequent launch. These reusable rockets have drastically cut launch costs — from $200 million to $60 million—and the figure is projected to come down to $5 million. Governments too have taken note of the trend.
- According to noted billionaire, Elon Musk, "If one can figure out how to effectively reuse rockets just like airplanes, the cost of access to space will be reduced by as much as a factor of a hundred. A fully reusable vehicle has never been done before. That is the fundamental breakthrough needed to revolutionise access to space."
- NASA's Space Shuttle typified this paradigm for many decades, but it was SpaceX's Falcon 9 rocket that really popularised it. It showed that reusable

rockets didn't have to be as large as the Space Shuttle and didn't require infrastructure at that scale either. Since then, many space agencies – public and private – have been pursuing their own reusable launcher programmes.

- In May this year, the Indian Space Research Organisation successfully flight tested its 'Reusable Launch Vehicle – Technology Demonstrator' (RLV-TD) from the Satish Dhawan Space Centre (SDSC) in Sriharikota, Andhra Pradesh. This winged craft, with its distinctive twin tail-fins, is intended as a key step toward the space agency's goal of creating a reusable launch vehicle that could cut launch costs by as much as nine-tenths.
- Advances in reusable rockets, lowered per-launch costs and miniaturization of satellites are opening up business opportunities which can make the global space industry to generate revenue of $1.1 trillion or more in 2040, up from the current $350 billion, according to a recent report.
- The Idea of exploiting celestial resources is older than any space exploration programme. As of now near Earth asteroids (NEA) appear to be suitable candidates for first mining incursion outside the planet. In this regard, reusable rockets would provide the wherewithal to achieve this goal.
- With SpaceX, Boeing, Virgin Galactic, and Blue Origin all inching closer to making history as the first privately funded companies to launch commercial passengers into space, reusable rockets will surely make 2020 the Year of Commercial Space Travel. Here, developing reusable rockets is about making space tourism a reality.
- Individuals and enterprises flush with funds are the key players in the present space race. They are betting on a future in which space is more accessible, enjoyable and exploitable, and public trips to Mars and back are a reality. Many have termed this as the dawn of the entrepreneurial space age.
- Following are some of the benefits or advantages of Reusable Rocket:
    - Cost for launching becomes much cheaper as it reduces material cost due to reusability.
    - Some of the reusable rockets use kerosene (of rocket grade type) as fuel which do not generate harmful chlorine as exhaust. This helps to protect the environment.
    - Effectively we can reuse rockets similar to airplanes, hence space travel will become cheaper to a greater extent.
- Ultimately, reusable rockets will make it possible for humans to explore deep space, and colonise other planets. SpaceX recently unveiled a design for its Interplanetary Transport System (ITS) - a system that involves using reusable rockets to propel spaceships filled with hundreds of passengers to Mars.

Conclusion

Space economy now includes everything from launch and satellites (both hardware for data sourcing and software for data analytics and applications), industrials (extractives and manufacturing), logistics (situational awareness, debris mitigation, on-orbit servicing), biospheres (habitats and life support systems), interplanetary (deep space technologies), information and research, and media and education

where reusable rockets would form the bedrock of making humans a multiplanetary civilization in the near future.

12. India has produced some of the most talented engineers that the world has seen. Can you discuss the contributions made by at least three such engineers?

Introduction

Indian engineers are renowned for their research and skills worldwide. Engineering in India can be traced to ancient civilizations. Engineers of ancient India were responsible for designing everything from complex water supply and drainage systems used by the extinct Harappa and Mohenjo Daro civilizations. This is reflected till present day with extensive contribution from Indians in engineering field.

Body

- The country is undergoing industrialization and working towards self-reliance in almost every sphere. The Indian government rightly deserves full credit for advancing meaningful research of engineering and science in India.
- India is home to some of the best engineering colleges in the world. These include College of Military Engineering, Indian Institute of Technology, National Institute of Technology and Indian Institute of Space Science and Technology, among others.
- Modern initiatives like 'Make in India' and 'Skills India' are providing a great platform for developing the industrial base of this country by promoting indigenous technologies and research as well as advanced skills required by foreign companies and other organizations that are eyeing investments in this country.
- According to a report published by global researcher and publisher, Elsevier, institutional collaboration in India accounted for 46 percent of impressive research and scholarly output while 16 percent was through tie-ups with foreign universities, companies, and other organizations.

India has produced many eminent engineers since ages, some of them can be as seen below:

1. Mokshagundam Visvesvaraya - was an Indian engineer, scholar, statesman and the Diwan of Mysore from 1912 to 1918. He is a recipient of the Indian Republic's highest honour, the Bharat Ratna, in 1955. He was knighted as a Knight Commander of the British Indian Empire by King George V for his contributions to the public good. Every year, on his birthday, September 15 is celebrated as **Engineer's Day** in India. He is held in high regard as a pre-eminent engineer of India. He was the chief engineer responsible for the construction of the Krishna Raja Sagara dam in Mysore as well as the chief designer of the flood protection system for the city of Hyderabad.
2. E Sreedharan - He is known as the **Metro Man of India**. He was a retired Indian Engineering Service (IES). He has done a lot to improve public

transport in India. He received his secondary education at Basel Evangelical Mission Higher Secondary School. He completed his Civil Engineering from the Government Engineering College, Kakinada, Andhra Pradesh known as JNTUK. Commonly known as the 'Metro Man,' Mr Shreedharan is the most-renowned civil engineer India has produced in the past few decades. His work with the Delhi Metro, the Kolkata metro, and many more metro projects across the country are well documented, making his moniker a well-deserved one.

3. A P J Abdul Kalam - He is known as the **missile man of India**. He also served as the 11th President of India from 2002 to 2007. APJ Abdul Kalam was born on 15 October 1931 at Rameswaram on Pamban Island, then in the Madras Presidency. He graduated from the Madras Institute of Technology in 1960. Then he joined the Aeronautical Development Establishment of the Defence Research and Development Organisation (DRDO) as a scientist. Kalam died on 27 July 2015 while delivering a lecture on"Creating a Livable Planet Earth" at the Indian Institute of Management Shillong.
4. Satish Dhawan - He is known as the father of **experimental fluid dynamics** research in India. Dhawan was born in Srinagar on 25 September 1920. He graduated from University of the Punjab in Lahore (now Pakistan) where he completed a Bachelor of Science in Physics and Mathematics, a Bachelor's degree in Mechanical Engineering. To honour his works in rural education, remote sensing and satellite communications satellite launch centre at Sriharikota, Andhra Pradesh was renamed the Satish Dhawan Space Centre.
5. Vinod Dham - He is known as the **Father of Pentium microprocessor chip**, a very popular term in the computer world. Vinod is also co-inventor of the flash memory technology, popularly known as SD cards widely used in USB drives, digital cameras, and many other storage devices. He holds a graduation degree in Electrical Engineering from Delhi College of Engineering. Presently Vinod is founding MD of Indo-US Venture Partners, an investment company with a focus on investing in Indian companies & start-ups of varied sectors. He is one of the top engineers in India

But at the same time, a recent survey carried out by Aspiring Minds has revealed that only 7% of engineering graduates in India are employed. According to this same report, only 3% of engineers in India have the suitable skills required to get a job in core sectors of engineering. Around 1.5 million engineers in India are released every year from various colleges but most of them simply do not have the skills required to be employed.

Conclusion

It is very unfortunate that the US imports most of the engineers from India when our own country is facing the crisis of quality and skills. Today, the market is looking for qualification along with certification. So, it becomes important for engineering institutions (especially private institutions) to create quality engineers instead of just giving away certificates. Today's India needs an engineer like Visvesvaraya to drive

this transformation with the same clarity, dynamism and courage to speak truth to power.

13. Examine the factors that are responsible for lesser number of patents registered by Indian universities/ institutions. What measures can be taken to address the same. Suggest.

Introduction

Universities and patents benefit each other. Patents help universities to improve their ranking, establish an innovation ecosystem, incubate knowledge-based start-ups, earn additional revenue and measure research activity. In this regard, India spent just 0.7% of its gross domestic product (GDP) in 2016-17 on R&D. Meanwhile, Japan, the US and China spent 3.2%, 2.8% and 2.1%, respectively, in 2017, according to the Organisation for Economic Co-operation and Development (OECD).

Body

- Patents occupy a prominent position as global indicators for ranking of the world economies. In general, there is a direct relation between the economy and the patent regime of a nation. Patent is an exclusive and territorial right granted by regional or national government.
- Patents in India are governed by the Indian Patents Act, 1970. The biggest change happened with the amendments in the early 2000s to make the law compliant with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).
- India witnessed significant changes in IPRs since the introduction of the National IPR Policy in 2016. In this context, while the disposal rates has increased, the filing rate for patents has not changed significantly. In 2016-17, the Patent Office reported a dip of 3.2% in filing compared to the previous financial year.
- As universities form the bedrock of innovation ecosystem, they face a strange human resources problem: despite the policy push to have more IP, India simply does not have enough IP professionals in the country.
- The dearth of IP professionals is due to the legal-centric approach where law schools and colleges are the only institutions which mandate teaching these subjects, which is one of the reasons why the supply of IP professionals is not keeping pace with demand.
- Poor infrastructure and limited resources have created a huge backlog which are constraining the higher educational institutes ability to bring in a dynamic IPR ecosystem.
- The lack of IP professionals to teach IP was one of the reasons that various committees could not suggest the mandatory introduction of IP courses in all technical institutes.
- India has a poor patent agent density, with only about 2,000 registered patent agents currently in practice. The last time when the Patent Office

conducted the patent agent exam, in 2016, around 2,600 candidates took it, a paltry number if one looks at the ambitious goals set by the IPR Policy.

- Another problem is that researchers in India tend to focus on publishing their work in journals instead of patenting them. Many consider emphasis on research papers publishing as counterproductive to patenting. One reason why researchers are shy of patenting their ideas in India is the time taken to get a patent which in 2017 was on an average 64 months to grant a patent.
- A key factor driving patent filings in the US is industry funding of research in universities, which totalled $4.2 billion in 2016, according to the National Science Foundation. The benefits of industry-academia collaboration cannot be overstated — Stanford University was instrumental in the rise of Silicon Valley. This aspect is missing in context of India.
- Patent filings and grants in India are dominated by foreign applicants: they filed two-thirds of patent applications in 2018-19, and got four-fifths of grants, according to the Office of the Controller General of Patents, Designs and TradeMarks.

To overcome these shortcomings, the following can be some of the measures towards addressing the challenges of IPR in Indian Universities/Institutes:

1. The number of patents applied for, granted and commercialised by universities and institutes is factored in in the National Institutional Ranking Framework (NIRF) rankings which clearly reveals that the top ranked engineering institutes in India are also the leading filers of patents.
2. The All India Council for Technical Education (AICTE) model curriculum for its member institutions should lay emphasis on the need for IPR education in technical institutes.
3. The path to patents is paved with research and funding. While Indian companies, including startups, universities and research institutes need to direct their attention towards generating more patents if India has to emerge as a hub of inventiveness, it also calls for increased spending on research and development (R&D) where India has targeted to more than double its R&D expenditure to at least 2% of GDP by 2022.
4. Fine-tuning the patent agent examination to cater to the growing IP needs of the country can be a successful way to build a band of professionals and create career opportunities
5. In a bigger push towards creating entrepreneurial universities, the University Grants Commission (UGC) should ask all universities in India to set up Intellectual Property (IP) Centres.
6. Further, these can be some more measures -
    a. Awareness creation b. Patent Information Centres (PICs)
    c. IPR Cells in Universities d. Training programmes

Conclusion

With the advances in China and the US are making in communications, artificial intelligence and healthcare technology, India cannot afford to sit on the sidelines,

and the only way for the country to get in on the action is to ramp up its R&D efforts and engender a culture of patenting in its universities and institutes.

14. Space is the next big frontier of technological revolution. Do you agree? What are those current trends that indicate towards a highly sophisticated and advanced future of space technology? Explain.

Introduction

Space technology has been one of the defining forces of the 20th and 21st century. The Soviet launch of Sputnik in October 1957 and the ensuing space race to the moon came to symbolize countries demonstration of their prowess and global influence. These bright moments, including the Apollo moon landing, were evidence of space technologies lighting a clear path to the future and in recent times, it is on the cusp of a great technological revolution.

Body

- Since the days of its heroic endeavors, space engineering has matured into a series of interconnected technologies that deliver exciting new space science missions which in the present times are rendering great technological advancement in space as well as use on earth.
- By democratizing access to space-based resources, we can create a more humane and just world. But realizing these benefits requires overcoming complex technical, legal, political and regulatory challenges.
- Present times is seeing a wave of start-ups driving dramatic and ongoing reductions in launch costs with innovations such as reusable boosters. The second is the development of Nano sats that are dramatically smaller, lighter and less expensive to build and launch than those typically used by governments or industry.
- Space is stepping up to the connectivity challenge posed by the fourth industrial revolution. One of the driving forces of this change has been the introduction of next-generation high-throughput satellite (HTS) systems. HTS will enhance the end user experience much like the terrestrial move from dial-up to broadband access.
- Space is quickly becoming a place where the industries that power our global economy will conduct business. Like any major change, this sharing economy in space faces major legal, regulatory and technical hurdles.
- Further, this change is being led by private enterprises unlike earlier governmental efforts, which makes it conducive to exponential growth in light of unlimited resources that the space economy provides.
- Space industry leading the technological revolution is evident from earlier precedent when technologies developed for Apollo and other missions had a spillover effect on various industries in the world. In present times, reusable rockets help in revolutionizing transportation on earth is one such example

- At the same time, there will also be need for mechanisms to track and control satellites to prevent their being used for criminal or terrorist purposes, as well as finding ways to safely destroy failed satellites so they don't cause damage to other satellites or space vehicles.

Following can be considered as some of the current trends that indicate a highly sophisticated and advanced future of space technology:

1. The global mining industry has tumbled in recent years from a market value of more than $1.6 trillion in 2010, to $714 billion in 2016, but this may change quickly once the "global" definition of mining is transformed by the emerging space resource industry. Space resources can be extracted from celestial bodies, most notably asteroids and the Moon.
2. Miniaturization of technology has enabled a range of spacecraft sizes, such as the 100kg small satellites used for the Disaster Monitoring Constellation, which consists of a coordinated group of individual satellites. There are even compact 30x10x10cm CubeSats, satellites weighing a few kilograms, which can carry a range of different payloads.
3. The ability to fabricate large, lightweight structures directly in orbit could have a huge impact on space technology, getting around the risky hurdle of launching delicate structures from the ground.
4. Spirit and Opportunity were the two successful Mars rovers that helped humans with many discoveries on Mars and were advanced enough to be controlled from the Earth. Both of these rovers exceeded their 90-day expected lifetime by several years making them one of NASA's most successful inventions. Present missions are building upon these like Mars 2020 mission.
5. Military and intelligence personnel have relied on satellite data for years to keep tabs on other nations and goings-on around the globe, but it was largely classified or otherwise restricted from the private sector. Now, looser regulations and lower costs are allowing companies to use that same kind of information for a variety of business reasons, such as near-real-time geospatial data visualizations of housing construction and other activity when planning new store locations.
6. Space habitats will be launched from Earth initially, but as the resource supply chain expands and metals from asteroids and the Moon become available, this sector will also come to rely on resources sourced from space.
7. In today's media-rich environment the concept of artificial intelligence is hard to miss, but its role in our space-based systems is easy to overlook. In fact, for some applications, it is already embedded. This will further help in the development of AI.

Conclusion

In the last few years, it has become clear that there is enormous potential to not only help bridge the technological shortcomings but to also create the means for new space based technological dividends. As with other cases in the new technological Revolution, these benefits coincide with the latest innovations in software, data processing and other booming sectors and it will be from the

combinations of those pieces that the really innovative solutions will emerge to further advance human civilization into space.

15. What do you understand by Trade-Related Aspects of Intellectual Property Rights (TRIPs) agreement? What are its implications for India? Explain with the help of suitable examples.

Introduction

The TRIPS Agreement, which came into effect on 1 January 1995, is to date the most comprehensive multilateral agreement on intellectual property. The areas of intellectual property that it covers are: copyright and related rights (i.e. the rights of performers, producers of sound recordings and broadcasting organizations); trademarks including service marks; geographical indications, including appellations of origin; industrial designs; patents including the protection of new varieties of plants; the layout-designs of integrated circuits; and undisclosed information including trade secrets and test data.

Body

- The TRIPs (Trade Related Intellectual Property) regime has emerged as the basic framework for ensuring intellectual property rights across the world. It is not the universal Intellectual property law. But it provides a basic framework. Every member of WTO should include TRIPs provisions in their domestic intellectual property legislations.
- The three main features of the Agreement are:
    - Standards- In respect of each of the main areas of intellectual property covered by the TRIPS Agreement, the Agreement sets out the minimum standards of protection to be provided by each Member.
    - Enforcement. The second main set of provisions deals with domestic procedures and remedies for the enforcement of intellectual property rights. The Agreement lays down certain general principles applicable to all IPR enforcement procedures.
    - Dispute settlement. The Agreement makes disputes between WTO Members about the respect of the TRIPS obligations subject to the WTO's dispute settlement procedures.
- The intellectual property rights regime of the country has been modified by a number of legislation since 1995. For India, the WTO's TRIPs agreement became binding from 2005 onwards as the country has got a ten-year transition period (1995-2005) to make the domestic legislation compatible with TRIPs.
- Here, India has got additional five-year transition period because of not having product patent regime in critical sector like pharmaceuticals. Hence, existing laws were amended and fresh legislations were introduced during this period.

- Different amendments to the various existing Acts- Patent Amendment Act (2005), the Copyright Amendment Act (2010), were made to strengthen domestic legal framework to fulfill the harmonization with the WTO's TRIPS agreement. Similarly, a number of fresh legislations were made to upgrade the country's intellectual property regime.
- Among all the provisions of the WTO agreement, the one relating to Trade Related Intellectual Property Rights (TRIPs) has possibly been the most widely debated in the country. There are reasons why this has been so.
    - First, because provisions in TRIPs relate to the country's Patent Laws and have a very serious bearing on major areas of the country's well being – health, agriculture, research, etc.
    - Second, because India has been particularly fortunate among all developing countries in having a very liberal Patents regime since 1970 that promoted the country's interests.
    - Third, because in the initial stages of the "Uruguay Round" of negotiations under the aegis of the then General Agreement on Tariffs and Trade (GATT), which finally led to the formation of the World Trade Organisation (WTO), India had been extremely vocal in opposing the inclusion of Patent laws in the negotiations.
- India moved from a process patent system to a product patent system in 2005. The patent law is one of the seven intellectual property laws protected under this agreement. Product Patent is the granting of patent to the 'final' product irrespective of the process used for obtaining the product. Once you obtain a patent on the product, then one is precluded from manufacturing that product, even though with a different process.
- The existence of process patents under the 1970 Indian Patents Act resulted in a robust growth of domestic pharmaceutical industry in India. At the same time, history also shows a decline in the business of foreign pharmaceutical companies in India.
- With the coming of the TRIPs Agreement, disputes have arisen with regard to the protection of pharmaceutical patents. TRIPs does not provide for the retrospective patenting in India of drugs that are already on the market or covered by existing patent applications elsewhere.
- The major changes made in the Indian Patent Act would have significant impact. The market would increasingly become technology driven. Indian firms would have to compete in the new scenario.
- The National Intellectual Property Rights (IPR) Policy 2016 was adopted in May 2016 as a vision document to guide future development of IPRs in the country. It's clarion call is **"Creative India; Innovative India"**.

Conclusion

The major changes introduced in the Indian Patent Act that were required to meet India's obligations to international agreements and treaties. The new Patents Act (Patents Amendment Act 2005) has created a strong patent system in India. Overall the present system has increased the scope of patenting and provides stringent safeguards to the patentee.

16. What are the recent setbacks to global climate change negotiations? What can be its possible implications?

Introduction

A UN report released last month warned that the world is currently headed toward a 3.2 degrees temperature rise by the end of the century, highlighting the impending danger of climate change for world where recently fight against climate change has seen some serious setbacks which may aggravate the fragile situation further.

Body

- The UNFCCC entered into force in 1994. Its objective is to stabilize the concentrations of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Kyoto Protocol, which requires a limited number of developed country Parties to limit or reduce their greenhouse gas emissions up to 2020, was adopted under the Convention in 1997.
- In order to address climate change more broadly, the Paris Agreement was negotiated and adopted in 2015. The goals of the Paris Agreement are to hold the increase in global average temperature to well below 2°C above pre-industrial levels, to pursue efforts to limit this increase to 1.5°C, to increase the ability to adapt to the adverse impacts of climate change and to make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.
- Under the Paris Agreement, Parties regularly communicate their Nationally Determined Contributions (NDCs) as part of the global response to climate change; the ambition of these contributions has to increase over time. The Paris Agreement also provides for a global stocktake which assesses the collective progress of all Parties towards achieving the goals of the agreement.
- In the previous climate change conference in Katowice in December 2018, the rules for the implementation of the Paris Agreement were largely defined. These include the information that Parties shall provide when communicating their NDCs, guidance for accounting for NDCs, guidelines for reporting on mitigation, adaptation and support to developing countries, and rules for the global stocktake.
- However, agreement on some aspects is still pending, such as common timeframes for NDCs or detailed provisions for the reporting of greenhouse gas emissions, mitigation actions and support. Most importantly, Parties still have to agree on the rules for voluntary cooperation between Parties, including the use of international carbon market mechanisms.
- One of the most serious setbacks in recent times seem to be the announcement in 2017 of USA to withdraw from Paris Agreement. In light of

the fact that the United States was the first major economy that ratified the Paris Agreement in 2016 and is also the largest greenhouse gas emitter, it will have serious consequences on the effectiveness of global climate change negotiations.

- In addition, the United States cut its contributions to the UNFCCC process and its support to developing countries in the area of climate change mitigation and adaptation. As a consequence, activities under the UNFCCC such as reviews or capacity building had to be scaled down.
- In light of this, it will not be easy for the country to keep its promises intact. For example, India's participation in the agreement was conditional upon receiving financial aid from developed countries to reduce its carbon footprints. India accounts for four percent of global emissions and, at Paris, it promised "to reduce its carbon footprint by 35 percent from its 2005 levels by 2030."
- Furthermore, the recent UN climate talks in Madrid ended in stalemate, with the negotiations running two days over time as countries squabble over rules for a new global carbon trading market. The talks, known as COP25, ran for 14 days and set a record for the longest-ever climate negotiations, but failed to produce any agreement on trading in carbon credits.
- The failure of COP25 to agree on the carbon market rules will complicate the task facing the UK, which takes over the presidency of the next UN climate talks in Glasgow next year. Almost 200 countries failed to agree unanimously on Article 6 of the Paris Agreement rulebook concerning the carbon markets system,
- If China dominates future negotiations, the ongoing tensions between the two nations will have a significant impact on India's place in such negotiations. To meet its solar targets, India needs around USD 100 billion, and this sector has enormous potential for foreign investments. These challenges will be the result of the failure of negotiations.
- Furthermore, Authoritative surveys of the mitigation pledges adopted to date by different countries strongly suggest that these will fall far short of what is required to achieve the 2°C goal if the present state of deadlock between countries is continued.
- While the developed countries are bent on diluting the North-South divide, citing the growing economic and political clout of developing nations, developing countries like India insist on retaining equity. This is evident from the multiple rounds of negotiations at international forums.

Conclusion

Thus, recent developments at the international level have renewed claims that cooperation would be more effective under a less formal approach, driven by decisions taken at the national level, with greater flexibility to accommodate domestic circumstances and priorities while also effectively addressing the global needs.

17. What measures has the Indian Government taken to address climate change? What further role can India play in the global efforts towards mitigating climate change? Suggest.

Introduction

India has the world's second largest population and fourth largest economy, where climate change is no more an environmental concern. It has emerged as the biggest developmental challenge for the planet. Its economic impacts, particularly on the poor, make it a major governance issue as well. Such a scenario has necessitated momentous efforts from India to tackle the global menace while also prioritising its developmental needs.

Body

Over several decades India has pursued policies and publicly funded programs focused on energy conservation and deployment of renewable energy technologies to fight climate change. This has been backed by legislation, regulation and tariffs arrangements. Some of these are:

- India ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1993 and the Kyoto Protocol in 2002.
- In June 2008, India announced its National Action Plan on Climate Change (NAPCC). The Action Plan effectively pulls together a number of the government's existing national plans on water, renewable energy, energy efficiency, agriculture and others – bundled with additional ones – into a set of eight missions. The Prime Minister's Council on Climate Change is in charge of the overall implementation of the plan. The plan document elaborates on a unique approach to reduce the stress of climate change and uses the poverty-growth linkage to make its point.
- Under the 2015 Paris Agreement, India set three major goals to be achieved for the period between 2020 and 2030—increase the share of non-fossil fuels to 40% of the total electricity generation capacity, to reduce the emission intensity of the economy by 33 to 35% by 2030 from 2005 levels, and to create additional carbon sink of 2.5 -3 billion tonnes of CO2 equivalent through additional forest and tree cover.
- India has emerged as a global leader in renewable energy, where investments top those into fossil fuel. After adopting its National Electricity Plan (NEP) in 2018, India remains on track to overachieve its "2˚C compatible" rated Paris Agreement climate action targets.
- Since 2010, the Indian Government has doubled the coal tax three times, reaching 400 rupees per tonne (around USD 3.2 per tonne) of coal produced and imported in the 2016–2017 budget.
- On transport, the Faster Adoption and Manufacturing of Electric Vehicles in India scheme came into effect in April 2019, and provides incentives to

purchase electric vehicles, while also including provisions to ensure adequate charging infrastructure.

- The main instrument to increase energy efficiency in industry is the Perform, Achieve and Trade (PAT) Mechanism, which is implemented under the 'National Mission on Enhanced Energy Efficiency'. PAT resembles an emissions trading scheme (ETS) and has been in place since 2012. The scheme is currently in its second phase (2016–2019). PAT differs from traditional cap-and-trade systems as it sets intensity-based energy targets
- Rural Electrification Policy, 2006: The policy promotes renewable energy technologies where grid connectivity is not possible or cost-effective.
- Energy Conservation Building Code, 2006: This regulatory code is designed to ensure energy efficiency in all buildings with above 500 kVA connected load or air-conditioned floor area over 1000 square metres.

India's future role in the global efforts towards mitigating climate change can be seen from the following points :

1. In 2007, then Indian Prime Minister Singh pledged that India's per capita emissions would never exceed those of the developed world. Meeting this pledge does not require any emissions reductions compared to current policy projections up to 2030.
2. Despite the negative trend in the power sector due to coal, India's Paris Agreement target is within the range of what is considered to be a "2°C compatible" fair share of the global effort. Further, India could become a global climate leader with a "1.5°C compatible" rating if it abandons plans to build new coal-fired power plants.
3. The Government is in the process of implementing carbon pricing mechanisms to encourage energy efficiency in industry. A pilot system for small to medium enterprises is expected soon. This can form the basis for global carbon pricing mechanism.
4. The government is also attempting to harness the potential of off-grid solar PV pumps to not only provide reliable electricity for pump sets, but also to provide additional income generation opportunities for farmers.
5. India has said that it will finalise its long-term plan strategies for development that result in lower levels of carbon dioxide and other greenhouse gas emissions by 2020. India also said that it will increase its climate pledges, or nationally determined contributions (NDCs), under the Paris Agreement.
6. The Indian Government is considering long-term growth strategies over the period 2030–2045 that would result in a decoupling of carbon emissions from economic growth.

Conclusion

Climate Change has emerged as one of the most serious environmental concerns of our times, which is a global phenomenon with diverse local impacts. The New Delhi Declaration should provide us with a sound basis for global cooperation, reflecting the consensus that addressing the challenge of climate change as an integral part of achieving sustainable development to create a better world for all our people.

18. What are the existing threats to the mountain ecosystem in India? Discuss. Suggest a sustainable strategy to maintain the ecological integrity of mountains.

Introduction

Mountain ecosystems are an important source of biological diversity, along with water and mineral resources where mountains are ecosystems with a distinct identity just like the flood plains, deltas, mangroves, wetlands, and deserts. Mountain ecosystems are particularly fragile, subject to both natural and anthropogenic drivers of change. Therefore, their effective management is not only important for mountain communities, but also for a sizeable proportion of the global population.

Body

- Ecosystems are of fundamental importance to environmental functioning and sustainability, and they provide many goods and services critical to individuals and societies. Beyond their common characteristics of high relative relief and steep slopes, mountains are remarkably diverse and globally important as centres of biological diversity.
- Recent scientific opinion led by the Intergovernmental Panel on Climate Change (IPCC) is that global climate change is happening and will present practical challenges to local ecosystems. The analysis and predictions showing an increase in the magnitude of climate change with altitude (in terms of both temperature and variation in precipitation).
- Ecosystems in the mountains are being impaired and destroyed by a wide variety of human activities. The survival of the ecosystems and wildlife in the mountains is being threatened by human activities like timber harvesting, intensive grazing by livestock, and agricultural expansion into forestland.
- Rapid and unsustainable economic and population growth in the mountainous regions is imposing increasing stress on the natural environment. As a result, environmental deterioration in mountains is driven by numerous factors, including deforestation, overgrazing by livestock, and the cultivation of marginal soils leading to soil erosion, landslides, and the rapid loss of habitat and genetic diversity.
- Forest ecosystems are stressed by habitat change and fragmentation, which occurs as humans subdivide forest plots into ever smaller and more isolated sections.
- Pollution can also stress forest trees, especially in urban, industrial, and heavily populated areas. Non-native fungal diseases and insect pests can severely stress forests and cause the effective extinction of previously dominant trees and threaten others.
- Species in high altitude areas – especially in the transition zone between subalpine and alpine – are more vulnerable to climate change. In addition,

the region's wetlands are being affected by the erratic weather observed in many parts of the region.

- Invasive species that outcompete native species and synergistically interact with climate change to threaten native organisms. Further, synergistic action between commercial harvesting and climate change will have detrimental impacts on subtropical and temperate timber forests.
- Environmental contamination- Nutrient enrichment from agricultural runoff could act synergistically with various factors due to increasing changes in biodiversity to enhance eutrophication in freshwater systems.

Proper management of mountain resources and the socio-economic development of people need immediate action. There is need to develop land use planning and management for mountain fed watersheds. Further, the government should give opportunities and following can be adopted to maintain the ecological integrity of mountains:

1. Promote erosion control measures that are low in cost, simple and can be easily used; Enhance forest management policy for the protection of natural forests (control and stop deforestation and ecological damage), prevent desertification processes, and mixed-use strategies.
2. Offer people incentives to conserve resources and use environmentally friendly technologies in mountainous ecosystems, help them to understand what is sustainable development in mountains and involve them in resource management;
3. Provide information on alternative livelihoods involving, for example, crops, livestock, poultry, beekeeping, fisheries, village industries, markets and transport;
4. Create protected areas to save Biodiversity (wild genetic resources); Adopt integrated ecosystem planning, monitoring, and management of vulnerable ecosystems.
5. Identify hazardous areas that are most vulnerable to erosion, floods, landslides, earthquakes, snow avalanches and other natural hazards and develop early warning systems and disaster response teams;
6. Identify mountain areas threatened by air pollution from neighbouring industrial and urban areas;
7. Create centres of information on mountain ecosystems, including expertise on sustainable agriculture and conservation practices where people can turn for help in learning about sustainable mountain development.

Conclusion

Maintaining resilience in mountain ecosystems is the primary objective of adaptation strategies for protecting wildlife and habitats. Activities that conserve biological diversity, reduce fragmentation and degradation of habitat, and increase functional connectivity among habitat fragments will increase the ability of mountain ecosystems to resist anthropogenic environmental stresses, including climate change.

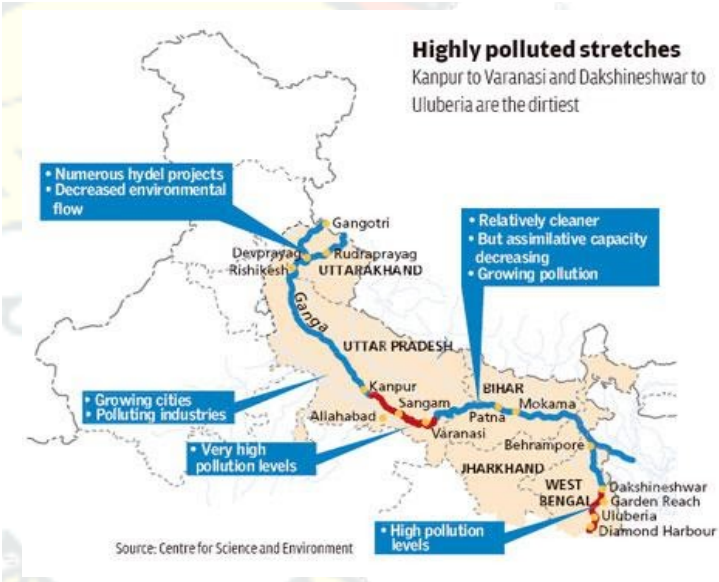
19. Identify the most polluted stretches of the Ganga and its tributaries. What are the factors contributing to the massive pollution along these stretches? Discuss.

Introduction

The Ganga rises on the southern slopes of the Himalayan ranges from the Gangotri glacier at 4,000 m above mean sea level. It occupies a unique position in the cultural ethos of India. It is one of the largest water drains of the world, densely populated and is critical for millions of people's health, prosperity, and spirituality living in the northern part of India. While the severity of ecological stress is clear since some time, the diversity and sheer immensity of the Ganga tributary system makes generalization difficult.

Body

In the recent past, due to rapid progress in communications and commerce, there has been a swift increase in the urban areas along the river Ganga.



As a result, the river is no longer only a source of water but is also a channel, receiving and transporting urban wastes away from the towns. Today, one third of the country's urban population lives in the towns of the Ganga basin.

- The purity of the water depends on the velocity and the dilution capacity of the river. A large part of the flow of the Ganga is abstracted for irrigation just as it enters the plains at Haridwar. From there it flows as a trickle for a few hundred kilometres until Allahabad, from where it is recharged by its tributaries.
- The Ganga receives over 60 per cent of its discharge from its tributaries. The contribution of most of the tributaries to the pollution load is small, except from the Gomti, Damodar and Yamuna rivers.
- Data from the past three CPCB reports, carrying water pollution monitoring figures on different stretches during 2002-17, shows that the number of polluted river stretches in the country increased from 121 in 2009 to 302 in 2015 and further to 351 in 2018.
- With regards to Ganga, only one of its five polluted stretches is in the critical category where the BOD level is more than 30 mg/l. This stretch was found

where Varuna river, a minor tributary, meets Ganga in Varanasi. The other polluted stretches include Haridwar-Sultanpur, Kannauj-Kanpur (UP), Buxar-Bhagalpur (Bihar) and Tribeni-Diamond Harbour (West Bengal).

The principal sources of pollution of the Ganga river can be characterised as follows:

1. Domestic and industrial wastes - It has been assessed that more than 80 per cent of the total pollution load (in terms of organic pollution expressed as biochemical oxygen demand (BOD)) arises from domestic sources, i.e. from the settlements along the river course.
2. Solid garbage thrown directly into the river.
3. Non-point sources of pollution from agricultural run-off containing residues of harmful pesticides and fertilisers.
4. Animal carcasses and half-burned and unburned human corpses thrown into the river.
5. Defecation on the banks by the low-income people.
6. Mass bathing and ritualistic practices.
7. Due to over-abstraction of water for irrigation in the upper regions of the river, the dry weather flow has been reduced to a trickle.
8. Rampant deforestation in the last few decades, resulting in topsoil erosion in the catchment area, has increased silt deposits which, in turn, raise the river bed and lead to devastating floods in the rainy season and stagnant flow in the dry season.

- Cleaning of river Ganga was started under Ganga Action Plan (GAP). GAP-I was launched in 1985 followed by GAP-II in 1993 with the objective of improving the water quality of river Ganga. These schemes were later merged with other schemes of National River Conservation Plan (NRCP).
- Government of India is supplementing the efforts of the state governments in addressing the pollution of river Ganga by providing financial assistance to the states. Namami Gange Programme is an umbrella programme which integrates previous and currently ongoing initiatives by enhancing efficiency, extracting synergies and supplementing them with more comprehensive & better coordinated interventions.

Conclusion

River Ganga has captured Indian's imagination since time immemorial. The river is believed by millions of Indians to have the capacity to wash away one's sins and purify the living and the dead. Such is the power of the Ganga that every region in India has its own small Ganga. These showcase the need to safeguard and preserve the fragile ecosystem of the river Ganga and its tributaries.

20. What are the manmade factors leading to the melting of ice in the Arctic region? Do you think exploration of the Arctic region for resources is environmentally sustainable in the long run? Comment.

Introduction

According to a recent study, the steady melt of glacial ice around the world is largely due to man-made factors, such as greenhouse-gas emissions and aerosols where humans have caused roughly a quarter of the globe's glacial loss between 1851 and 2010, and about 69 percent of glacial melting between 1991 and 2010. Consequently, the arctic region has been the most affected region with regard to melting of ice.

Body

- Arctic sea ice has been rapidly declining since satellites first started tracking it in 1979, and according to NASA, roughly 13.3 percent of the ice disappears every decade. Further, air currents that are a part of Earth's natural variability have played a significant role in melting the ice, which helps explain why the earlier models have underestimated the melting.
- In this regard, the man made factors for melting of ice in the arctic region can be seen from below :

a) Burning of fossil fuels - The burning of fossil fuels has resulted in the build-up of greenhouse gases in the environment thus influencing the warming trend because they trap heat in the atmosphere. Research shows that glaciers/ice cover are capable of absorbing about 20% of heat from the sun, reflecting back the remaining 80%. The increase in temperatures is causing more and more glaciers and ice cover to melt, consequently, this ends up exposing the earth underneath.

b) Oil and gas drilling - The oil and gas extraction process also emit Methane, which is the main constituent in natural gas. Plus, the gas is more damaging to the environment than carbon dioxide, locking in heat more efficiently and escalating global warming. In recent times, these industries have increased in arctic region.

c) Deforestation - Trees play a very important function in balancing the ecosystem and the overall cooling of the planer. Perhaps, that is why they are called the planet's "natural fans". So, cutting down trees to create more space for human activities is actually proving detrimental to the environmental balance in the region.

d) Ice breaking ships - During the months of summer, icebreaking ships head to the north into the Arctic Ocean, breaking through the ice at sea, the ships end up leaving trails of open waters. The Arctic sea ice is able to reflect most of the heat thus aiding in keeping the Arctic and the rest of the Northern Hemisphere cool.

- A recent study found that if the world warms 2 degrees Celsius over preindustrial times—the lofty goals laid out in the Paris climate agreement—there is still a 39 percent chance that the Arctic summer sea ice will disappear. Further, very little industrial development has taken place in the Arctic region and there are fears about the impact on the environment if – as expected – human use accelerates fast.

- As the Arctic warms, increased political interest in the region is occurring, driven by the belief that it will become accessible to greater commercial activity. Global warming is opening up the Arctic Ocean to transit by ships, which can cut east-west voyage times by one-third. Warmer weather allows oil and mining companies to tap into previously inaccessible new reserves.
- The melting of sea ice is progressively opening opportunities to navigate on routes through Arctic waters. This could considerably shorten trips from Europe to Pacific, save energy, reduce emissions, promote trade and diminish pressure in the main trans-continental navigation channels. But concerns regarding this such as drift ice, lack of infrastructure and environmental risks, nevertheless still remain.
- The impact of oil and gas exploration in the Arctic region include threats like noise pollution, water dispersal in the drilling phase and the actual drilling process which can release oil and chemicals into the water. Further, the transport of oil and gas in the Arctic region by tanker and pipeline poses severe problems of environment impacts.
- Long-lasting consequences often persist through industrial waste, tailings, and environmental contaminants. At sea, oil spills are the largest potential environmental threat. They are difficult to control and can spread over 100s – 1000s unnoticeably harming the ecosystems.
- Arctic ecosystems are simple in structure, but often have long food chains which link both terrestrial and marine ecosystems. Here, A number of species can be affected by the rise in temperature and its results. This ranges from fish stock in the Arctic Ocean which is sensitive to the ocean temperature, even small can result in major shifts in the geographical locations and productivity in the stock.
- Another factor that can magnify the problem is the lack of emergency response capability for mitigating pollution and saving lives in the event of an accident. Hence, the opening up of new opportunities becomes a huge challenge to the arctic communities in both positive and negative ways.

Conclusion

The arctic environment is largely unspoiled but human actions including global warming are having a rapid impact. There are fears that diminishing arctic sea ice, which is one of the Earth's ways of deflecting heat from the sun, is shrinking. Only through approaching the tasks collaboratively will it be possible to find lasting solutions, so international cooperation becomes essential in having a sustainable arctic environment in the future.

21. Examine the adverse impacts of excessive sand mining on the river ecosystem.

Introduction

Sand mining is a practice that is used to extract sand, from various environments, such as beaches, inland dunes and dredged from ocean beds, and river beds of

deltaic regions. Today, demand for sand and gravel continues to increase. By 2020, 1.4 billion tonnes of sand will be required in India. Sand mining is thus a lucrative business and fuels illegal extraction. Illegal and unscientific sand mining is turning out to be one of the biggest ecological disasters in modern India.

Body

- Sand is vital for sustenance of rivers. River supports an extraordinary array of species, many of which are under threat due to habitat destruction. During the past 3-4 decades, river systems of the world have been altered significantly due to indiscriminate sand mining. Sand mining has many deleterious direct and indirect effects on the physical, chemical and biological environments of river systems.
- Excessive sand mining can alter the river bed, force the river to change course, erode banks and lead to flooding. It also destroys the habitat of aquatic animals and micro-organisms besides affecting groundwater recharge.
- Depletion of sand in the streambed and along coastal areas causes the deepening of rivers and estuaries, and the enlargement of river mouths and coastal inlets. It may also lead to saline-water intrusion from the nearby sea. The effect of mining is compounded by the effect of sea level rise. Any volume of sand exported from streambeds and coastal areas is a loss to the river ecosystem.
- Sand mining disturbs the equilibrium of a river channel because it intercepts material load moving within a dynamic system and triggers an initial morphological response to regain the balance between supply and transport. Channel widening causes shallowing of the streambed, producing braided flow or subsurface inter-gravel flow in riffle areas, hindering movement of fish between pools.
- It is now widely realized that, in spite of the short term benefits, the indiscriminate sand mining from the rivers is detrimental to these life sustaining systems, in the long run. Moreover, the effects of instream sand mining may not be visible immediately because it requires continuous monitoring and takes a decade or more to surface and propagate the effects along the river channel in measurable units.
- Mining which leads to the removal of channel substrate, resuspension of streambed sediment, clearance of vegetation, and stockpiling on the streambed, will have ecological impacts. These impacts may have an effect on the direct loss of stream reserve habitat, disturbances of species attached to streambed deposits, reduced light penetration, reduced primary production, and reduced feeding opportunities.
- Sand-and-gravel mining in stream channels can damage public and private property. Channel incision caused by gravel mining can undermine bridge piers and expose buried pipelines and other infrastructure.
- Apart from threatening bridges, sand mining transforms the riverbeds into large and deep pits; as a result, the groundwater table drops leaving the drinking water wells on the embankments of these rivers dry. Bed

degradation from instream mining lowers the elevation of streamflow and the floodplain water table which in turn can eliminate water table-dependent woody vegetation in riparian areas, and decrease wet periods in riparian wetlands.

- The problem is serious in the case of the rivers in the southwest coast of India, especially in Kerala, where the rivers are small with limited river bed resources. At the same time, the mining of sand is on the rise to meet its ever increasing demand in the construction sector.
- Guidelines on the extraction of sand say that the amount of sand removed should be in proportion to its replenishment rate and river width. Mining from a braided channel with a wide floodplain will have less impact than from a narrow channel. Manual mining is preferred over the use of machines but enforcement and monitoring of these guidelines remain weak.
- A few states are exploring options like manufactured sand, produced by crushing of rocks and quarry stones, to meet the ever-increasing demand of the construction industry. The new sand mining framework suggests the use of geo-fencing, and GPS-enabled transportation to check illegal mining. Price control, the involvement of women self-help groups and regular audits of sand reserves have also been recommended.

Conclusion

Sand sustains the rivers and the percolation of water to far off distances both for the growth of trees to sustain drinking water and raise cultivation. It is almost a lifeline to the human existence. The nation is to advance industrially and economically by the proper development and exploitation of these resources. It has to be remembered that the sand once removed cannot be replaced in the next generation as it takes centuries for replacement.

22. Odisha's promptness and effectiveness in mitigating cyclones makes it a model state disaster management. Elucidate.

Introduction

Learning its lessons from the super-cyclone of 1999 which claimed 10,000 lives in Odisha, the eastern state has, over the years, emerged as a role model in disaster preparedness. With decades of positive intervention by the government, civil society groups, and NGOs, the state has received praise from numerous national and international organization's, including the United Nations.

Body

- In the aftermath of Cyclone Fani, one of the worst cyclones to hit India's eastern coastline, Odisha had proved it is one of the most disaster-ready states in the world. In preparation for Cyclone Fani, Odisha carried out 'one

of the biggest human evacuations in history,' with more than a million people evacuated into 9,000 shelters in 24 hours.

- According to UN, Odisha's zero casualty approach to managing extreme weather events is a major contribution to the implementation of the Sendai Framework (for disaster risk reduction) and the reduction of loss of life from such events.
- The Odisha State Disaster Management Authority (OSDMA) was established in 1999, much before the Disaster Management Act was passed in 2005, and the National Disaster Management Authority (NDMA) was constituted in 2001. OSDMA was the first disaster management authority center established in India, or perhaps the world, given its scale of operations.
- Even today, Odisha, along with Assam, Gujarat, and Bihar are the only states with active State Disaster Management Authorities (SDMAs). These states have their own offices, management, and staff. In most states, SDMAs are still being run out of the State Revenue Department Office, which is a temporary arrangement

Even more recently, Cyclone Bulbul in 2019 highlighted how Odisha has mastered disaster management – with lessons for other disaster-prone cities and states. In this regard, lessons in disaster relief for the country include:

1. Resilient infrastructure (cyclone shelters) - The Odisha State Disaster Mitigation Authority (OSDMA), a constituent of the state government, designed some 800 multipurpose cyclone and flood shelters in the coastal districts in association with the Institute of Information Technology (IIT) Kharagpur.
2. Autonomous disaster-management authority - The Odisha Disaster Management Authority (ODMA) was set up as an autonomous body to combat emergency situations during disasters. It has proven to be highly effective as the state is no longer dependent on central government and can act quickly.
3. Technology - Millions of SMS messages were sent out by Location Based Alert System (LBAS) and Group Based Alert System (GBAS) to warn people. The "SATARK" (System for Assessing, Tracking and Alerting Disaster Risk Information based on Dynamic Risk Knowledge) of Odisha State Disaster Management Authority (OSDMA) has won the IT Excellence Award, 2019 for its innovative conception by using information technology in the field of disaster management.
4. Preparedness - Odisha has recently implemented its ambitious Early Warning Dissemination System (EWDS). Using the mechanism, OSDMA can activate sirens across 122 towers operational across the state's 480 km coastline, alerting the population at the press of a single button.
5. Empowering Community - Empowering the community has been a big game-changer. All vulnerable regions in Odisha have active Cyclone Management Centre's, which are community-based organizations with the local Sarpanch as the president. Community is the first point of contact for rescue and preparedness. Odisha has managed to create a sense of community during such disasters that other states can also emulate. Cyclone evacuation is a

social process, and people's decision to evacuate depends on how they perceive the risk from the warning message.

6. Future preparedness - Odisha has raised 20 units of Odisha Disaster Rapid Action Force (ODRAF), comprised of highly trained personnel with multi-disaster tackling capabilities. They are trained in tackling floods, building collapses, cyclones, biological and nuclear disasters. Odisha plans to create a network of weather forecasting Doppler radars across the state. Odisha's focus in disaster management and risk reduction now includes a broader range of potential hazards, including the impacts of climate change.

At the same time, the Government of Odisha certainly needs to think about investing in creating safer housing especially in the coastal regions, and in creating electrical systems that are underground. This will not only help minimize the need for evacuation, but also save on the systematic investments that are made when household assets are lost during a disaster.

Conclusion

Disaster is dynamic, and with the climate change situation, the intensity and frequency of disasters is changing. In the future, such extreme events are predicted to hit coastal areas with more intensity due to climate change, and this necessitates that governments address socio-economic problems along with cyclone adaptation programmes to make disaster management more effective.

23. What are public health disasters? What are the most common measures to Address such disasters? Explain.

Introduction

People across the world are faced with a wide and diverse range of risks associated with Public health disasters. These comprise infectious disease outbreaks, natural hazards, unsafe food and water, chemical and radiation incidents, antimicrobial resistance, the effects of climate change, and other sources of risk.

Body:

Developments such as climate change, unplanned urbanization, population growth, migration and state fragility are increasing the frequency, severity and impacts of many types of public health disasters throughout the world.

India has faced many public health disasters in recent cases of Nipah, Zika, Chikungunya and Avian Influenza outbreak along with Japanese Encephalitis among children in Bihar.

Most common response to Public Health disaster:

- Risk Assessment: A multi-disciplinary central team from the National Centre for Disease Control to investigate and respond, in close coordination with state government officials.
- Emergency preparedness: Syndromic surveillance enhancement. Hospital and community surveillance strengthening. Involvement of national testing laboratories like National Institute of Virology conducted laboratory testing to confirm and rule out cases.
- Response and Recovery: Specific guidelines such as case definitions; guidelines for hospital infection prevention and control; guidelines for sample collection and transportation; clinical management guidelines for suspected and confirmed cases; guidelines for safe disposal of dead bodies; and information for the general public and for health care personnel. Risk communication messages to the community, public, partners and other stakeholders.
- Training and capacity building for health care personnel in the following areas: sample collection and transportation; safe disposal of dead bodies; contact tracing; hospital waste management; hospital infection prevention and control; and the use of personal protective equipment.
- Multisectoral and multidisciplinary approach: The government coordination amongst all relevant sectors including zoonoses, wildlife, animal husbandry, human health, clinicians, pulmonologists, neurologists, biologists and private sector.
- Disease Surveillance system with common control room: The Strategic Health Operations Centre (SHOC) at the National Centre for Disease Control to monitor the outbreak.

The management of these risks is vital to protect people's health from emergencies and health disasters, to ensure local, national and global health security, to attain UHC and to build the resilience of communities, countries and health systems.

Conclusion

Preparedness measures are necessary to deal in emergencies of public health disasters. It is important for implementing the SDGs, including the pathway to Universal Health Coverage and target 3d to "strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks."

24. Are you aware of the term 'urban naxal'? Is it a mere rhetoric or it has some substance? Critically comment.

Introduction

The phrase of Urban Naxals, which is **not clearly defined**, is loosely attributed to the people with **naxalite bent of mind** residing in urban areas and working as activists, supporters and protectors of the ideology while the active Naxals battle it out in the

jungles and vast swathes of Maoist-dominated areas. But in recent times, anybody raising strong questions against the government is being perceived as an urban naxal, which is a very serious malice.

Body

- The concept of "urban Naxalism" refers to an **old Maoists strategy** to focus on urban centres for leadership, organise masses, build a united front and engage in military tasks such as providing personnel, material and infrastructure.
- A 2004 **Communist Party of India (Maoist) document titled "Urban Perspective"** elaborates on this strategy with one of the most important focus areas being on gaining leadership from urban areas. In relation, the security establishment believes that with ageing leadership the Maoists have been looking at cities and towns for leaders.
- The role of the Urban Movement within the military strategy of the Maoists has been best explained by **Mao Tse Tung** thus: "the final objective of the revolution is the capture of the cities, the enemy's main bases and this objective cannot be achieved without adequate work in the cities".
- The security establishment add that the CPI (Maoist) give immense importance to its '**urban movement**' not just for the leadership, but for providing supplies, technologies, expertise, information and logistic support by overground activists.
- The main focus of the Maoists' urban work is to **organise the masses**, including the working class, students, middle class employees, intellectuals, women, dalits and religious minorities. It explains the need to create front organisations for extending the reach of the organisation.
- Another key point is that while focussing on the organised sector, it also highlights the need to mobilise the unorganised segment as well. It adds that the urban movement should involve sending cadres to the countryside, supplying arms and ammunition, infiltrating enemy ranks and sabotage actions.
- Here, the Maoists seem to be acting on a **long-term perspective plan**. In their scheme of things, they hope to gain control over the working class movement and use it appropriately at a later stage when their so called New Democratic Revolution advances and furthers.
- In the immediate to short-term — according to an internal document of the CPI (Maoist) — the objective is to gain control over key (strategic) industries such as communication, oil and natural gas, coal, transport, power, defence production, etc with a view to inflicting 'damage' on the state's capacity to fight the rebels, either through organising sabotage activities or bringing production to a halt.
- But at the same time, over the past few years, some commentators in the country have been frequently **using the term "Urban Naxal" to label anyone** – from academics to activists – who questions the policies of the state or are perceived to be anti-establishment. These commentators say that these

activists are covertly aiding those who are working to break India, such as Naxalites and Kashmiri separatists.

- According to the **present narrative**, **'Urban Naxal**s' are a group of people trying to destroy all that is Indian by **encouraging "Breaking India" forces** such as the banned Communist Party of India (Maoist) and foreign-funded Christian missionaries. It does not matter that there is little evidence to support any such claim.
- The **demonisation of activists** is more dangerous in India because the State is seen to be using such rhetoric to justify its excesses. In this context, many Left-leaning activists have been wrongly linked with Naxals, while most of them are an anathema to the insurgents.
- Such an approach is in turn leading to **giving an upper hand to insurgents** as it perpetuates a myth about their spread and might, something that is essential for an underground warrior and also pushes students, academics, etc towards their cause due to constant hounding as "urban naxals".

Conclusion

Naxal movement is not an entirely internal security issue. The factors for its spread are still present even in urban areas, which need to be controlled. At the same time, to paint overt and peaceful political rebellions as Naxalism is bad tactic, a political and moral blunder, which should be avoided. Rather, the government should focus on curtailing the propaganda of the real Maoists.

25. How can skill development and promotion of rural entrepreneurship address the challenge of Naxalism in the tribal pockets of India? Examine.

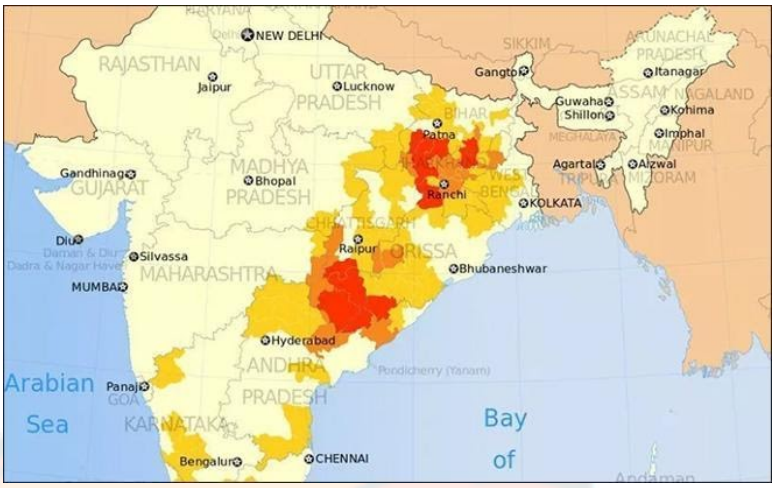
Introduction

The Maoist problem has been identified by many experts and leaders, including the Prime Minister, as the **most serious internal security challenge** that the country is faced with. In this regard, improved governance and effective implementation of development schemes, in the form of skill development, can help overcome the challenge of Naxalism.

Body

- The Maoist/Naxal movement in India is among the longest and most lethal homegrown insurgencies that the world has seen. While the origin of Left-Wing Extremism (LWE) in India goes back to the **Telangana peasant rebellion (1946-51)**, the movement took the young republic by storm in 1967.
- It was **formed to fight for the cause of peasants and the landless**, the armed militia launched a series of daring attacks, assassinations and bombings targeting landlords, upper-caste leaders and politicians. The movement has seen **many periods of ups and downs** where its spread across India progressively increased into the tribal regions of central India.

Map - Current spread of CPI-Maoist



- To address issues of education and employment in Maoist affected regions, the Ministry of Skills Development & Entrepreneurship (MoSDE) launched two new schemes, namely, '**Skill Development in 47 LWE affected districts**' and '**Pradhan Mantri Kaushal Vikas Yojana (PMKVY)**' for creating infrastructure and providing employment linked skill training to youth in affected areas.
- Further, undertaking "**Skill Development Programme**", which includes in-house training, aimed at equipping tribal youth to acquire the necessary knowledge, skill and proficiency in the operation of Mine/Plant to help them in seeking employment can help in attracting the youth.
- Paying appropriate **stipend** during the period of the programme and offer free/subsidized breakfast, lunch, uniforms, tool kits, etc along with establishment of ITI/ Polytechnic Colleges exclusively for tribal youth providing entire infrastructure facilities, including residential quarters and hostel buildings for students, to develop local talent suiting to the needs of the industry.
- These measures can help towards **leaning away the tribal youth** from the clutches of naxalites as many analysts have shown that in the absence of viable employment opportunities, youth tend to take up arms. Also tribal youth form the **foot soldiers of Naxal/Maoist movement** where ideological motivations are minimum.
- Such an approach can be seen to have succeeded in **Andhra Pradesh** where the core component of the counter-insurgency strategy was what is called "**winning hearts and minds**": cutting down the influence of the Maoists by undertaking development and good-governance measures to address the grievances of the civilian population sympathetic to the insurgent cause, including the tribal communities.
- The Andhra Pradesh state succeeded in stamping out left-wing extremism by combining police action with **socio-economic programmes** implemented by an **effective service delivery mechanism.**
- In present times too, at the national level such an approach has helped in controlling the Naxal movement. The chart clearly shows it.

Chart - Rapid decline in Maoist-related fatalities

Conclusion

After many years of indifference, half-steps and ad hoc measures, both India's central and state governments have found their foothold against the Maoist insurgency that at its pinnacle may have seemed invincible. This seems to have been possible due to Indian state's combined both population-centric and enemy-centric approaches in dealing with the Maoist insurgency where skilling tribal youth is playing an important role.

26. The China-Pakistan axis is a geo-strategic and security headache for India. Do you agree? Substantiate.

Introduction:

The navies of China and Pakistan held their sixth bilateral naval exercise, titled Sea Guardians-2020, in the northern Arabian Sea. Such military exercises are expected to strengthen security cooperation between the two countries, who are already "iron brothers." The growing bonhomie between China-Pakistan is beyond symbolism require India to adopt more vigilant and cautious approach.

Body:

The China-Pakistan axis has many underlying principles explained by Samuel Huntington as sinic-islamist alliance of power and culture along with traditional anti-India synergies.

Challenges posed by China-Pakistan axis at geostrategic horizon:

- China-Pakistan Economic Corridor: China is using Indian land area illegally occupied by Pakistan violating sovereignty of India. Though China always maintained Jammu and Kashmir is a bilateral issue, India has concerns over the internationalization of the Kashmir issue, reflected in criticism of removal of article 370.
- String of Pearls: Gwadar port of Pakistan can become outpost for PLA navy eventually along with massive port development surrounding India in Sri-

Lanka, Bangladesh. Growing influence of China in the Indian Ocean major cause of worry for India.

- Afghanistan Peace process: China and Pakistan working in close cooperation to bring Taliban to table and exclude India from the political solution in Afghanistan, which will undermine Indian efforts, infrastructure and investments in Afghanistan.
- Threats to Indian interests overseas: China consistently blocking India's membership in Nuclear Supplier Group at the haste of Pakistan, first time 'informal consultations' on India-Pakistan dispute after 1971 due to Chinese initiative.

Security headache:

- Nuclear terrorism: China and Pakistan being nuclear states on the northern and western border make India country with one of the most hostile neighbors with Pakistan, India has unresolved Kashmir issue and with China India do not have mutually agreed boundary settlement. It necessities India to develop resilient security apparatus.
- Proxy war in Jammu and Kashmir, Ladakh and Punjab: Pakistan has continuously tried to destabilize India internally, with support to separatists.
- Moral support and Training to North-east militancy groups and Left wing extremism: China in the post provided safe havens, arms and training to northeast militant groups and moral support to left wing extremism.
- Radicalization and Fundamentalism: Pakistan has been the center of Islamic fundamentalism and terrorism of the world. It has indulged in many terror attacks on Indian cities and China supported Pakistan in UN repeatedly reflected in repeated technical hold to designate JeM head Massod Azhar as terrorist who eventually declared so with consistent diplomatic efforts.

Indian response to China-Pakistan Axis:

- India has taken strong action against both China and Pakistan in the recent past with border stand-off with China in dock-lam and surgical strike and air strike in Pakistan.
- India refused to participate in Belt and Road Initiative of China becoming the only major economy.
- India increased Strategic relationship with US reflected in the development of Quad to counter China.
- India's proactive diplomacy in West Asia has dented support to Pakistan from Islamic world.

However, India has experienced the similar challenge in the US-Pakistan axis for more than five decade which eventually became blur with the consistent efforts of Indian diplomacy, economic might and changing global order.

Conclusion:

India cannot have idealistic view of China as if the economic interest in India will dominate the geostrategic and security ambitions vis-e-vis relationship with India.

Indian approach should be to develop more deep relationship with China to make Pakistan more responsible state and at the same time focus on building economic power and strategic alliances across the globe to increase deterrence.

27. The giants in the field of internet and social media like Google, Amazon, and Facebook etc are based out of India. How does it pose a security threat to India?

Introduction:

Social media has emerged as one of the national security concern in India during Assam riots and mass exodus of northeast Indian from major Indian cities to the recent violent student protests and mob lynching incidents in India. It has been observed that foreign base of internet and social media giants pose challenge to efficient monitoring and deterrence against security threats to India.

Body:

India has faced many security issues with the use of Social Media in recent past like rioting, lynching, recruitment for terror organization and radicalization by fundamental group.
Security threats due to out of India Internet and Social Media giants:

- Indian laws are ill-equipped to deal with social media giants due to their location. At most India can only censure the giants and ask cooperation, taking hasty steps to ban such multinationals like China way will dent India's image as vibrant democracy and liberal economy.
- India neither has technology infrastructure nor sufficient able manpower to categories private, sensitive data of Indians and control outward flow.
- Indian data highways are outward directed due to exponential increase of social media use with more than one billion mobile phones and increasing digital inclusion create threat of profiling Indian citizen data for various purposes like economic and social behavior of India by foreign country.
- Major Complicating Factors to secure the networks and Media Much of the hardware and software that make up the communications ecosystem is sourced externally.
- End to End encryption used in phones to send and receive messages, restricts the government's ability to monitor and increases the threat of terrorism and crimes of trafficking, smuggling.
- Open source intelligence creation for foreign intelligence networks with optimal processing.

However, India has taken various measures to increase surveillance and monitoring such as – National Intelligence Grid (NATGRID), National Cyber Coordination Centre (NCCC) of India. It has also appointed BN Srikrishna Committee to review data protection in India.

Need to follow principle of Data Localization:

- As per BN Srikrishna committee recommendation, Personal data will need to be stored on servers located within India, and transfers outside the country will need to be subject to safeguards. Critical personal data, however, will only be processed in India.
- Cross border transfer of data must be subject to model contract clauses on the lines of General Data Protection Regulation of EU.

Conclusion:

There is need to increase digital literacy of Indians and increase awareness about potential threats posed by cyber security to both individual and nation as a whole. India should focus its energy on development of critical technologies to monitor data flow and become pioneer in new technology development with economic capacity to establish its own social media and internet giants.

28. What role can the media play in strengthening the internal security ecosystem? Suggest.

Introduction

Internal security, a subset of national security, is concerned with threats and challenges emanating from within a country and has the potential to threaten public order and national security. It has been well documented that mass media poses internal security challenges through various means such as terrorism which makes future of nation uncertain.

Body

"The media is the most powerful entity on earth. They have the power to make the innocent guilty and to make the guilty innocent, and that's power, because they control the minds of the masses."

— Malcolm X1 , an African American Human Rights Activist.

- India faces intense internal turbulence and disturbances due to rebellion movements, ethnic conflicts and religious fundamentalism. According to the Indian Constitution, "Public Order" and "Police" figure as entries 1 and 2 respectively in the State List in the Seventh Schedule whereas the union or central government can exercise similar powers only in the Union Territories.
- Our Constitution emphasizes an active and independent media which is highly maintained on the ideals of freedom of speech and expression as contained in Article 19 of the Indian framework, and which allows the Indian journalists to be spontaneous activists in the overall governance of the country.
- Media role in internal security can be analyzed from the prism of news, views and issues. How it presents them to the populace can help either in strengthening or weakening the basics of internal security. In the globalized

world it has to strike a balance between people's right to know on the one side and national security and social ethics on the other.

- The Indian media also continues to provide channels of communication, helping to educate, inform and exchange information between the public and its Government. Thus, the ability to influence the attitudes and behaviour of countries and their policies has helped the Government to initiate its national strategic goals through an integrated, coordinated and combined media that acts as a tool and channel for information dissemination and enlightenment.
- The mainstream Indian media reflects the distinct differences of its people and thoughts by supporting and catering to two types of media outlets and audience: the English language media and the non-English language media, including various newspapers, magazines and television channels, thereby upholding the difference in expression and perspectives of its multi-cultural population, and showcasing the true essence of India.
- To elaborate on the relation between media and its role in safeguarding national security there are a number of examples where Indian media has portrayed an effective role in providing information to the public, and confirming the actions of the government on the issues of national security. In August 1999, Pakistan Navy's Naval Air Arm Breguet Atlantique patrol plane was shot down by the Indian Air force for violating Indian air space as it was flying close to the Indian border off the Rann of Kutch in Gujarat.
- In this case, the Indian media's support for its country and the timely information that it provided to the domestic and international audience, helped not only the Indian public but also the foreign media grasp the ground situation, which in turn, influenced the judgment of the ICJ against Pakistan.
- Further, many times, the media has brought out the reports of lapses in governments preparedness related to internal security and thus bringing accountability. In India, the media has played a great role in highlighting the issues of human rights violation by security forces, absence of latest arms and technologies with police forces and thus creating a public opinion against such lapses.
- It has helped in building resilience against any kind of efforts by ISIS to spread roots in India by creating a popular opinion against it.
- It has helped by giving a space for the dis-heartened people to vent their anger. This alternative has helped in maintenance of law and order in a great way.
- The Indian media's role in influencing national and international public opinion by analyzing and providing coverage of worldwide events has grown immensely due to the 24x7 concept. It has helped the media and journalists to play a greater role in influencing high level national and international decision-making.
- But, in recent times because of proliferation of news channels and their rivalry with another for TRP instances of yellow journalism, dissemination of unverified news and one sided information by some unscrupulous news channels have emerged. Such actions of media have negative impact on long term internal security.

Conclusion

In the 21st century, the States need to deal with other States and a variety of supranational and Non-State actors. It is, thereby, important that the media and the institutions of security work together to educate the public, to understand the national security policy, and also hold policymakers to account.

29. Do you think left wing extremism has got further strengthened by the use of Social media? Critically examine.

Introduction

A number of Left Wing Extremist outfits have been operating in certain remote and poorly connected pockets of the country for a few decades now. The Maoist insurgency doctrine glorifies violence as the primary means to overwhelm the existing socio-economic and political structures. This threat has amplified in recent times due to the advent of social media.

Body

- Turning away from their ancient method of handwritten letters and prehistoric communication system, the Left Wing Extremists (LWE) are now becoming tech savvy. They are using social networking sites and modern communication systems more effectively so that they can reach out to the common people particularly to the urban and semi-urban population- the area where the LWEs want to increase their domination.
- According to intelligence reports, the naxal groups are taking advantage of communication channels which have become more sophisticated over a period of time. From mobile phones, terrorists have moved on to the use of satellite phones, spoofed IDs and coded transactions over e-mail and chat sessions. Voice over Internet Protocol is also being extensively used to communicate across the border.
- LWE's have been using Facebook as an active tool for the propagation of their ideologies. This is an important observation as it goes on to show that Naxalites have started using the Internet as a medium of propagation. This is quite worrisome as they now have access to a user base of over 400 million Internet users in India, which accounts for about 35% of the Indian population.
- However, there are several other tools that LWEs use to communicate and coordinate better in an orderly fashion. Through the use of encrypted instant messaging apps such as Skype or Whatsapp, they can securely communicate with their fellow comrades regarding their plans and strategies for the battlefield without being easily tracked.
- Alternatively, the LWEs could also use digital marketing strategy to sow fear amongst the people, something similar to the ISIS terrorist group. ISIS used provocative twitter hashtag campaign (#AllEyesOnISIS) to give an air of

inevitability to the looming destruction and atrocities as they marched into the Iraqi city of Mosul. Naxalites, in a similar fashion, can use similar provocative, choreographed videos to create a way of intimidation and fear amongst the general audience.

- In a bid to reach out to common people - particularly those living in urban and semi-urban areas - the Red rebels are making use of social networking sites and the internet. It is important for Naxalites to create their content in the English language to grab the attention of the urban and educated population.
- At the same time, Naxals use of the internet has provided an alibi for other forces inimical to causes of social justice to slander progressive thinking activists and people. Also, the reach and effectiveness of Naxals in use of social media has been doubted by many experts.

Conclusion

Considering the power and reach of social media, public movements even in the past have been strengthened and their reach has transcended geographical boundaries. While this might be put to some good use it might also be misused which is something to think about. Naxalites' violent approach has not been efficient in their struggle to be heard. Their use of social media can ultimately be a turning ground for them to create a more organized and coordinated movement to reach their goals.

30. Has demonetization been able to make a dent in terrorist funding? Critically Examine.

Introduction

The central government had demonetized the high-value denomination notes in 2016 with objectives to eliminate black money, curb infusion and circulation of fake notes, create deterrence to the funding of terror and left-wing extremism, facilitate the transition of the non-formal economy into a formal economy and boost digitalization.

Body

- The finance of terrorism in India follows a hybrid model, which includes terror funding from within and beyond the country's borders. Terrorists have employed a variety of formal and informal channels to fund their activities.
- Since illegally held cash forms the major chunk of terrorist funding, after the Demonetization, most of the cash held with the terrorists turned worthless. Demonetization also led to instant extinguishment of Pak-printed high quality fake Indian currency notes. It also adversely affected the hawala operators.
- While hawala cash transfers to terrorists and separatist elements based in Kashmir, which were mostly in denomination of Rs 500 and Rs 1,000, have

come to an abrupt halt, Maoist groups, particularly in states like Bihar and Jharkhand, are at pains to "convert" the extortion money that has been stocked as piles of cash.

- The bigger casualty in terms of sheer volume of funds, however, is Left-wing extremism. Intercepts of recent conversations among CPI(Maoist) leaders based in Bihar and Jharkhand show them discussing the fear of losing their piles of cash collected through extortion and 'levy'.
- The financial hit likely to be taken by a terrorist group is closely linked with its cash reserves, the ability to retain liquidity in a business where terror groups choose to invest and the ease of reconverting these assets into liquid money.
- Groups in Northeast India and the CPI (Maoist) operating in the Naxal affected areas of the country are likely to be hit the most, as a large proportion of their financial reserves are more likely to have been held as cash. Further, investments in property will become relatively difficult to liquidate in order to recreate funds for organizational support mechanisms.
- In contrast, Pakistan and J&K based terror groups, while impacted, will be able to recuperate faster, as they are financed by the Pakistani state, rich donors in West Asia, voluntary collections in Pakistan, FICN or drug money.
- None of these can be impacted in the long term and to the extent that terror organizations are unable to sustain themselves. However, the impact will certainly be felt in the immediate and midterm future, wherein, the cash available for sustaining activities like civil disobedience in Kashmir Valley, will be sucked out of the terror economy.
- Two of the most vulnerable sectors that have traditionally been exploited for parking crime proceeds and black money is the property, and gems and jewelry market. These sectors have also been used for the temporary investment of terror funds. Unless transactions are made transparent and reflect real market value, black money and terror funds will continue to find their way into these businesses.
- The objective of Demonetization is linked with removing unaccounted wealth (black money), criminal proceeds (which is different from black money), as well as FICN and Indian currency hoarded and distributed by terrorist groups. There are different estimates of the percentage of cash within the overall share of each of these three categories. However, irrespective of the percentage of cash, it is certain that removing a major portion of cash alone will not resolve any of these challenges.
- There is a need to take interlinked steps and it is only the sum of these individual initiatives that can impact the larger fight against the financing of terrorism.

Conclusion

Demonetization was an important step in the fight against the finance of terrorism. However, it should neither be the first nor the last, if the interlinked threats of corruption, crime and the finance of terrorism have to be controlled. These must also not be addressed simply within departmental and ministerial silos. Instead, an all-of government approach is imperative if each of these challenges is to be met.

31. Critically evaluate the institutional framework established to thwart cyber security threats in India.

Introduction

The digital economy today comprises 14-15% of India's total economy, and is targeted to reach 20% by 2024. India has more than 120 recognized 'data centers' and clouds. These factors clearly necessitate a robust institutional framework to thwart cyber security threats and secure the national cyber space.

Body

- With more inclusion of artificial intelligence (AI), machine learning (ML), data analytics, cloud computing and Internet of Things (IoT), cyberspace will become a complex domain, giving rise to issues of a techno-legal nature. Sectors such as healthcare, retail trade, energy and media face advanced persistent threats (APTs).
- Further, incidents relating to data leakage, ransom ware, ATM/credit cards denial of service, diversion of network traffic intrusion in IT systems and networks using malware are also on rise. Attacks on embedded systems and IoT have also registered a sharp increase of late.
- Currently, the Information Act, 2000 is the primary law for dealing with cybercrime and digital commerce in the country. The Act was first formulated in 2000, and then was revised in 2008 and came into force a year late. The Information Technology (Amendment) Bill, 2008 amended a number of sections that were related to digital data, electronic devices and cybercrimes.
- In this regard, the Government has taken several steps to prevent and mitigate cyber security incidents. These measures and their analysis include:

1. Establishment of National Critical Information Infrastructure Protection Centre (NCIIPC) for protection of critical information infrastructure in the country. Inadequate cyber security professionals available to partner with NCIIPC to cover the whole sector is one of the major drawbacks.
2. All organizations providing digital services have been mandated to report cyber security incidents to CERT-In expeditiously. More coherence is needed in CERT operations for greater effectively.
3. Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) has been launched for providing detection of malicious programmes and free tools to remove such programmes. The reach of this initiative has been an issue which needs to be tackled expeditiously.
4. Issue of guidelines for Chief Information Security Officers (CISOs) regarding their key roles and responsibilities for securing applications / infrastructure and compliance.
5. Provision for audit of the government websites and applications prior to their hosting, and thereafter at regular intervals. Such measures need to be regularized and institutionalized.

6. Empanelment of security auditing organizations to support and audit implementation of Information Security Best Practices.
7. Conducting cyber security mock drills and exercises regularly to enable assessment of cyber security posture and preparedness of organizations in Government and critical sectors.
8. Conducting regular training programmes for network / system administrators and Chief Information Security Officers (CISOs) of Government and critical sector organizations regarding securing the IT infrastructure and mitigating cyber-attacks.
9. Further, the Government has launched the online cybercrime reporting portal, www.cybercrime.gov.in to enable complainants to report complaints pertaining to Child Pornography/Child Sexual Abuse Material, rape/gang rape imageries or sexually explicit content.
10. Also, The Central Government has rolled out a scheme for establishment of Indian Cyber Crime Coordination Centre (I4C) to handle issues related to cybercrime in the country in a comprehensive and coordinated manner.

The concept of 'active cyber defense' is generally being adopted to address the new challenges. Examples of this are EU's General Data Protection Regulation (GDPR). The global multi-stakeholder model of internet governance is showing cracks. In this regard, following step can be considered in India-

- One, a concise 'National Cyber security Strategy' that sets clear, top-down directions to enhance the cyber resilience for the ecosystem that includes government, public and private sectors, the citizenry, and also addresses international cyber issues.
- Two, a separate 'Cyber security Policy' based on principles laid down in 'strategy'. It must be outcome-based, practical and globally relevant, as well as based on risk assessment and understanding of cyber threats and vulnerabilities.

Conclusion

According to the National Cyber Security Coordinator, India is at number 23 of the UN Global Cyber security Index (GCI) 2017. Thus, an accountable national cyber security apparatus must provide clear mandates and be empowered adequately. It must be able to supervise and enforce policies across India, including policies regulated by independent regulators.

32. What is the Golden Crescent? What challenges does it pose for India? Discuss.

Introduction

South Asia is wedged between the world's two largest areas of illicit poppy cultivation, commonly referred to as the Golden Crescent and the Golden Triangle. Here, the 'Golden Crescent' comprises the opium producing areas of South-West

Asia, including Afghanistan and parts of Pakistan's North-West Frontier Province and Baluchistan which poses grave challenge to India's stability.

Body

Golden Crescent poses the following challenges for India:

1. On Socio-Political Fabric of society- Drug trafficking undermines the socio-economic and political stability and sustainable development.
2. Loss of Human Capital- Drug trafficking affect valuable human lives, result in loss of economic advantage to country and loss productive year of many persons around the country.
3. Health issues- It creates unnecessary health problems like growing prevalence of HIV/AIDS among people.
4. Threat to National Security- Involvement of various terrorist group and their connection in drug trafficking leads to threat to national security and sovereignty of the states by the way of Narcoterrorism.

In this regard, some recent steps taken by India to overcome the above include:

1. Legislative measure by enacting Narcotics Drugs and Psychotropic substances Act 1985 and Prevention of Illicit Trafficking of Narcotics Drug and Psychotropic Substances Act 1988
2. India is signatory to all three UN Conventions namely, Single convention on Narcotics Drugs 1962, the 1971 Un convention on Psychotropic Substances and 1988 UN Convention against Illicit Trafficking of Narcotics Drugs, Psychotropic substances to curb drug menace.
3. Ensuring the physical security of the borders and coasts by strengthening Patrolling and surveillance.

Conclusion

Drug trafficking, organized crime, Money Laundering and terrorism are interrelated activities so need Multi-pronged approach, can be handled by synchronizing and coherence among domestic laws of neighboring countries to deter drug traffickers and also for translational exchange of criminals.

33. Is there any nexus between left wing extremism and terrorism in India? Critically analyze.

Introduction

India is among the worst victims of terrorist violence. The country has suffered massive casualties amongst civilians as well as security forces, besides colossal damage to private and public property due to terrorist incidences.

Body

- Terrorism can be defined as the illegal use of force or violence against people to create a wave of terror to achieve specific political or sectorial objective.
- On the Other hand Left Wing Extremism seen as necessary internal security issue in which people uprising against their own government over developmental and land related issues.

In India, for the development of Left wing extremism following reasons are responsible

- Land related factors
  1. Evasion of land ceiling laws
  2. Existence of special land tenures
  3. Lack of title to public land cultivated by landless poor.
  4. Non regularization of traditional land rights
- Governance Related Factors
  1. Corruption and poor provisions/non provisions of non-essential public services including primary health care and education
  2. Misuse of powers by police and violation of the norms of laws.
  3. Perversion of electoral politics
- Displacement and forced Evictions
  1. Eviction from traditionally used by tribal.
  2. Displacement caused by mining, irrigation and power projects without adequate arrangements for rehabilitation.
- Livelihood Related Causes
  1. Lack of food security-corruption in the Public Distribution system
  2. Deprivation of traditional rights in common property resources.

Apart from the above factor, formation of FRONT ORGANISATION to facilitate mass mobilization in semi urban and urban areas through ostensibly democratic means considered as terrorist action against India. Most of the Front organization are led by well-educated intellectuals with the firm belief in the Maoist Insurgency doctrine. These Ideologies functions as masks to cover the violent nature of the CPI (Maoist) Ideology.

The CPI (Maoist) also have a strategic game-plan to create a 'UNITED FRONT' with all like-minded insurgent/terrorist outfits in India. Many of these outfits are supported by external forces inimical to India and CPI (Maoist) consider such alliance as Strategic Assets.

In a nutshell, the CPI(Maoist) the main LWE outfit in India, aims to overthrow the existing democratic state structure with violence as their primary weapon and mass mobilization and Strategic United Fronts as complementary components and plans to usher in so called 'NEW DEMOCRATIC REVOLUTION' in India.

Conclusion

An Ideology based violence and annihilation is doomed to fall in a democracy which offers legitimate forums of grievance redressal. The Government is optimistic about eradicating the LWE problems through the strategic vision like Development and Improvement in governance and Public perception management etc.

34. What is CERT-in? What is its mandate? What are the bottlenecks in its effective functioning? Comment.

Introduction:

In the written reply to Parliament by Meity, as per the information reported to and tracked by Indian Computer Emergency Response Team (CERT-In) 3,13,649 cyber security incidents were reported during the year 2019 till October, which highlight the growth of cyber incident reporting in the country.

Body:

CERT-in is the national nodal agency with the objective of securing Indian cyber space. CERT-in provides incident prevention and response services as well as Security quality management services.

Mandate of CERT-in:
In the Information Technology amendment act, 2008, CERT-in has been designated to serve as the national agency to perform the following functions in the area of cyber security:

- Collection, analysis and decimation of information on cyber incidents.
- Forecasts and alerts of cyber security incidents.
- Emergency measure for handling cyber security incidents.
- Coordination of cyber incidents response activities.
- Issue guidelines, advisories and vulnerability notes and whitepapers relating to information security practices, procedures, prevention, response and reporting of cyber incidents.

And such other function relating to cyber security as may be prescribed.

Bottleneck in effective functioning:

- CERT-in does not impose any obligation on government entities to report cyber incidents unless they come under any of the expressions service providers, data centers, intermediaries or body corporate.
- This would mean that if the data kept with the Registrar General & Census Commissioner of India is hacked in a cyber-incident, then there is no statutory obligation under the CERT Rules on it to report the incident.
- There has been delay in acknowledgement of cyber security incident in Kudankulam Nuclear Power plant.
- CERT Rules provide for a mandatory obligation to report the cyber incidents listed therein, the Rules themselves do not provide for any penalty for noncompliance.

- There is lack of legal obligation to report to the data subjects whose data is stolen or is put at risk due to the said breach.

However, it does not mean that there are no consequences for noncompliance, as under the parent legislation i.e. the IT Act mentions the appropriate penalties for noncompliance.

Conclusion:

Cyber incidents have serious consequences for societies, nations, and those who are victimized by them. The theft, exploitation, exposure or otherwise damage of private, financial, or other sensitive personal or commercial data and cyber-attacks that damage computer systems are capable of causing lasting harm.

35. What is the mandate of the National Security Guard (NSG)? What makes NSG an elite security agency? Discuss.

Introduction:

The National Security Guard (NSG) is an elite counter-terrorism unit under the Ministry of Home Affairs. It was raised following Operation Blue Star, Akshardham Temple attack and the assassination of Indira Gandhi, for combating terrorist activities with a view to protect states against internal disturbances.

Body:

Mandate of National Security Guard:

- NSG, under the existing constitutional framework, can be deployed by the Central government only at the request of the concerned States. The Force is not designed to supplant the function of the State police forces and other paramilitary forces of the Union of India.
- The main tasks of the NSG are neutralization of specific terrorist threats in any given area or point by engaging the terrorist with swift action.
- To handle hijack situations by storming the aircraft.
- It has also created an information centre/research and documentation Wing to amass information on various terrorist groups, their strategies, weapons and tactics.
- The NSG also trains personnel from various State police and paramilitary organization to deal with anti-terrorist operations, and bomb detection and disposal.
- It maintains continuous liaison with various institutions in the country dealing with anti -terrorist training.

Elite Security Force:

- Deputationist force: Multi service recruitment through Indian Army, Central armed police force and state police force with world class zero error force standards.

- International Standard: The NSG was modeled on the pattern of the SAS of United Kingdom and GSG-9 of Germany.
- Task oriented force: Counter terrorism and anti-hijacking has been the main focus for the NSG. The diversion of NSG to VIP protection removed recently.
- Specialized Training: Rigorous training ensure all personnel of the Force are extremely physically fit, perfect in shooting skills, have the requisite technical skills and are highly motivated, aggressive and mentally alert at all times.
- Foreign collaboration: The National Security Guard has conducted international exchanges and joint training with foreign Special Forces, including those from Germany, Russia, United States, France, Israel and Australia.

However, there were questions over lack of terrain information to NSG in different geographies led to delay in conclusion of operation in Pathankot Attack. There are also issues with the intelligence and coordination among stakeholders in counter-terror operation.

Conclusion:

A Force like the NSG is indispensable in view of the growing terrorist violence in different forms. In future, the dependence on the NSG is likely to increase with long term comprehensive policy against terrorism.