

Disaster Management in India

Disaster management in India has been an important point of discussion owing to frequent natural disasters ranging from earthquakes, floods, drought etc. This makes the issue of disaster management worthwhile to be considered as part of the preparation for UPSC exams. In this post, you will read all about disaster and disaster management with regards to the Indian context.

Loss of life and property due to these disasters have been steadily mounting throughout the world due to inadequate technology to combat disasters, rise in population, climate change and continuing ecological degradation. The global efforts to manage disasters have proven to be insufficient to match the frequency and magnitude of natural disasters.

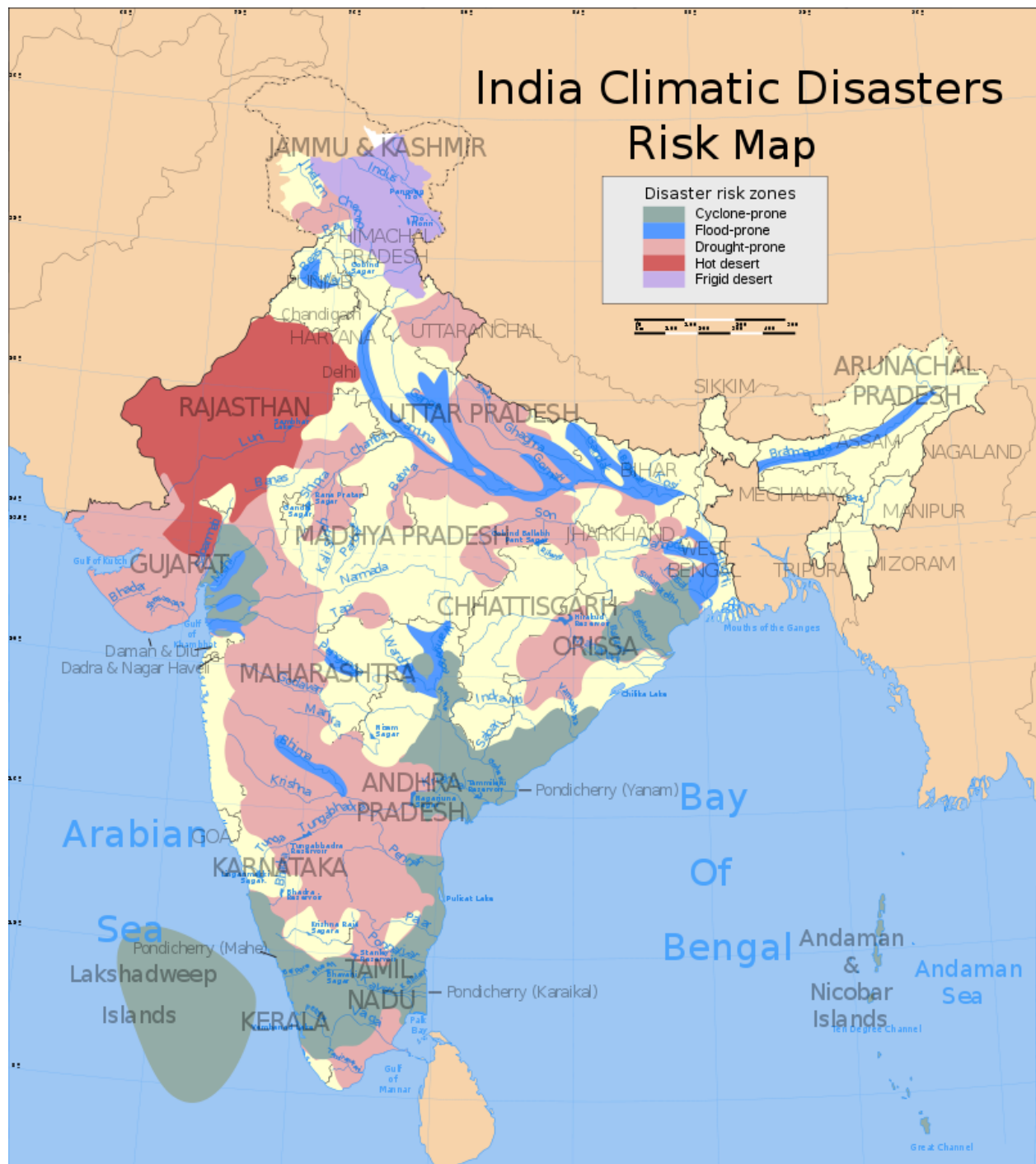
Table of Contents:

1. What is a Disaster
2. What is Disaster Management
3. Biological Disasters
4. Legislations for prevention of Biohazards in India
5. Legal Framework for Biological Disasters
6. NDMA Guidelines for Crowd Management UPSC
7. Disaster Prevention and Mitigation

What is a Disaster?

A disaster is defined as a disruption on a massive scale, either natural or man-made, occurring in short or long periods of time. Disasters can lead to human, material, economic or environmental hardships, which can be beyond the bearable capacity of the affected society. As per statistics, India as a whole is vulnerable to 30 different types of disasters that will affect the economic, social and human development potential to such an extent that it will have long-term effects on productivity and macro-economic performance.

The various disaster-prone zones in India can be inferred from the map below:



Disasters can be classified into the following categories:

- **Water and Climate Disaster:** Flood, hail storms, cloudburst, cyclones, heat waves, cold waves, droughts, hurricanes.
- **Geological Disaster:** Landslides, earthquakes, volcanic eruptions, tornadoes
- **Biological Disaster:** Viral epidemics, pest attacks, cattle epidemic and locust plagues
- **Industrial Disaster:** Chemical and industrial accidents, mine shaft fires, oil spills,

- **Nuclear Disasters:** Nuclear core meltdowns, radiation poisoning
- **Man-made disasters:** Urban and forest fires, oil spill, the collapse of huge building structures

What is Disaster Management?

Per the Disaster Management Act of 2005 defines Disaster Management as an integrated process of planning, organizing, coordinating and implementing measures which are necessary for-

1. Prevention of threat of any disaster
2. Reduction of risk of any disaster or its consequences
3. Readiness to deal with any disaster
4. Promptness in dealing with a disaster
5. Assessing the severity of the effects of any disaster
6. Rescue and relief
7. Rehabilitation and Reconstruction

Agencies involved in Disaster Management

- **National Disaster Management Authority (NDMA):-** The National Disaster Management Authority, or the NDMA, is an apex body for disaster management, headed by the Prime Minister of India. It is responsible for the supervision, direction and control of the National Disaster Response Force (NDRF).
- **National Executive Committee (NEC):-** The NEC is composed of high profile ministerial members from the government of India that include the Union Home Secretary as Chairperson, and the Secretaries to the Government of India (GoI) like Ministries/Departments of Agriculture, Atomic Energy, Defence, Drinking Water Supply, Environment and Forests etc. The NEC prepares the National Plan for Disaster Management as per the National Policy on Disaster Management.
- **State Disaster Management Authority (SDMA):-** The Chief Minister of the respective state is the head of the SDMA. The State Government has a State Executive Committee (SEC) which assists the State Disaster Management Authority (SDMA) on Disaster Management.
- **District Disaster Management Authority (DDMA):-** The DDMA is headed by the District Collector, Deputy Commissioner or District Magistrate depending on the situation, with the elected representatives of the local authority as the Co-Chairperson.

The DDMA ensures that the guidelines framed by the NDMA and the SDMA are followed by all the departments of the State Government at the District level and the local authorities in the District.

- **Local Authorities:-** Local authorities would include Panchayati Raj Institutions (PRI), Municipalities, District and Cantonment 11 Institutional and Legal Arrangements Boards, and Town Planning Authorities which control and manage civic services.

Now let's have a look at some of the types of disasters and the means to combat them.

Biological Disaster

Definition: The devastating effects caused by an enormous spread of a certain kind of living organism that may spread disease, viruses or infestation of plant, animal or insect life on an epidemic or pandemic level.

- I. Epidemic Level – Indicates a disaster that affects many people in a given area or community.
- II. Pandemic Level – Indicates a disaster that affects a much larger region, sometimes an entire continent or even the whole planet. For example, the recent H1N1 or Swine Flu pandemic.

To know more about Bio-Terrorism threat to India and India's Preparedness visit the linked article.

Biological Disasters – Important points to remember for UPSC

1. The nodal agency for handling epidemics – Ministry of Health and Family Welfare
 - I. Decision-making
 - II. Advisory body
 - III. Emergency medical relief providing
2. The primary responsibility of dealing with biological disasters is with the State Governments. (Reason – Health is a State Subject).
3. The nodal agency for investigating outbreaks – National Institute of Communicable Diseases (NICD)
4. Nodal ministry for Biological Warfare – Ministry of Home Affairs (Biological warfare is the use of biological agents as an act of war)

Biological Disasters – Classifications

Charles Baldwin developed the symbol for biohazard in 1966.



symbol for biohazard

The US Centres for Disease Control classifies biohazards into four biosafety levels as follows:

1. BSL-1: Bacteria and Viruses including *Bacillus subtilis*, some cell cultures, canine hepatitis, and non-infections bacteria. Protection is only facial protection and gloves.
2. BSL-2: Bacteria and viruses that cause only mild disease to humans, or are difficult to contract via aerosol in a lab setting such as hepatitis A, B, C, mumps, measles, HIV, etc. Protection – use of autoclaves for sterilizing and biological safety cabinets.
3. BSL-3: Bacteria and viruses causing severe to fatal disease in humans. Example: West Nile virus, anthrax, MERS coronavirus. Protection – Stringent safety protocols such as the use of respirators to prevent airborne infection.
4. BSL-4: Potentially fatal (to human beings) viruses like Ebola virus, Marburg virus, Lassa fever virus, etc. Protection – use of a positive pressure personnel suit, with a segregated air supply.

Legislations for prevention of Biohazards in India

The following legislation has been enacted in India for the prevention of biohazards and implementation of protective, eradication and containing measures when there is an outbreak.

1. The Water (Prevention and Control of Pollution) Act, 1974
2. The Air (Prevention and Control of Pollution) Act, 1981
3. The Environmental (Protection) Act, 1986 and the Rules (1986)
4. Disaster Management Act 2005, This provides for the institutional and operational framework for disaster prevention, mitigation, response, preparedness and recovery at all levels.

Prevention of Biological Hazards

The basic measure to prevent and control biohazards is the elimination of the source of contamination. Some of the prevention methods are as follows:

Preventive Measures for workers in the field (medical)

- I. Engineering controls – to help prevent the spread of such disasters including proper ventilation, installing negative pressure, and usage of UV lamps.
- II. Personal hygiene – washing hands with liquid soap, proper care for clothes that have been exposed to a probably contaminated environment.
- III. Personal protection equipment – masks, protective clothing, gloves, face shield, eye shield, shoe covers.
- IV. Sterilisation – Using ultra heat or high pressure to eliminate bacteria or using biocide to kill microbes.
- V. Respiratory protection – surgical masks, respirators, powered air-purifying respirators (PAPR), air-supplying respirators.

Prevention of Biological Hazards (Environmental Management)

Safe water supply, proper maintenance of sewage pipelines – to prevent waterborne diseases such as cholera, typhoid, hepatitis, dysentery, etc.

Awareness of personal hygiene and provision for washing, cleaning, bathing, avoiding overcrowding, etc.

Vector control:

Environmental engineering work and generic integrated vector control measures.

Water management, not permitting water to stagnate and collect and other methods to eliminate breeding places for vectors.

Regular spraying of insecticides, outdoor fogging, etc. for controlling vectors.

Controlling the population of rodents.

Post-disaster Epidemics Prevention

The risk of epidemics is increased after any biological disaster.

Integrated Disease Surveillance Systems (IDSS) monitors the sources, modes of diseases spreading, and investigates the epidemics.

Detection and Containment of Outbreaks

This consists of four steps as given under:

1. Recognising and diagnosing by primary healthcare practitioners.
2. Communicating surveillance information to public health authorities.
3. Epidemiological analysis of surveillance data
4. Public health measures and delivering proper medical treatment.

Legal Framework for Biological Disasters

- I. The Epidemic Diseases Act was enacted in the year 1897.
- II. This Act does not provide any power to the centre to intervene in biological emergencies.
- III. It has to be substituted by an Act which takes care of the prevailing and foreseeable public health needs including emergencies such as BT attacks and use of biological weapons by an adversary, cross-border issues and international spread of diseases.
- IV. It should give enough powers to the central and state governments and local authorities to act with impunity, notify affected areas, restrict movement or quarantine the affected area, enter any premises to take samples of suspected materials and seal them.
- V. The Act should also establish controls over biological sample transfer, biosecurity and biosafety of materials/laboratories.

Institutional Framework

In the Ministry of Health & Family Welfare (MoH&FW), public health needs to be accorded high priority with a separate Additional Directorate General of Health and Sanitation (DGHS) for public health. In some states, there is a separate department of public health. States that do not have such arrangements will also have to take initiatives to establish such a department.

Operational Framework

At the national level, there is no policy on biological disasters. The existing contingency plan of MoH&FW is about 10 years old and needs extensive revision. All components related to public health, namely apex institutions, field epidemiology, surveillance, teaching, training, research, etc., need to be strengthened.

At the operational level, Command and Control (C&C) are identifiable clearly at the district level, where the district collector is vested with certain powers to requisition resources, notify a disease, inspect any premises, seek help from the Army, state or centre, enforce quarantine, etc. However, there is no concept of an incident command system wherein the entire action is brought under the ambit of an incident commander with support from the disciplines of logistics, finance, and technical teams, etc. There is an urgent need for establishing an incident command system in every district.

There is a shortage of medical and paramedical staff at the district and sub-district levels. There is also an acute shortage of public health specialists, epidemiologists, clinical microbiologists and virologists.

Biosafety laboratories are required for the prompt diagnosis of the agents for effective management of biological disasters. There is no BSL-4 laboratory in the human health sector. BSL- 3 laboratories are also limited. Major issues remain regarding biosecurity, the indigenous capability of preparing diagnostic reagents and quality assurance.

Lack of an Integrated Ambulance Network (IAN). There is no ambulance system with advanced life-support facilities that are capable of working in biological disasters.

State-run hospitals have limited medical supplies. Even in normal situations, a patient has to buy medicines. There is a lack of stockpile of drugs, important vaccines like anthrax vaccine, PPE or diagnostics for surge capacity. In a crisis situation, there is further incapacitation due to tedious procurement procedures.

- National Disaster Response Force (NDRF):- The command and supervision of the NDRF would be under the Director-General of Civil Defence and National Disaster Response Force selected by the Central Government. Currently, the NDRF comprises of eight battalions who will be positioned at different locations as per the requirements.

NDMA Guidelines for Crowd Management

Planning the strategy for management

1. Understanding visitors
2. Understanding stakeholders
3. Crowd Management strategies
 - Capacity planning
 - Understanding Crowd behaviour

- Crowd disaster process
 - Crowd control
 - Stakeholder approach
4. Risk analysis and preparedness
 - Identify threats or causes
 - Risk assessment
 - Planning
 - Develop a course of action
 5. Information management and dissemination
 6. Safety and security measures

Medical Emergency Services



Role of Media

Broadly we can categorise the role of media in the following way:

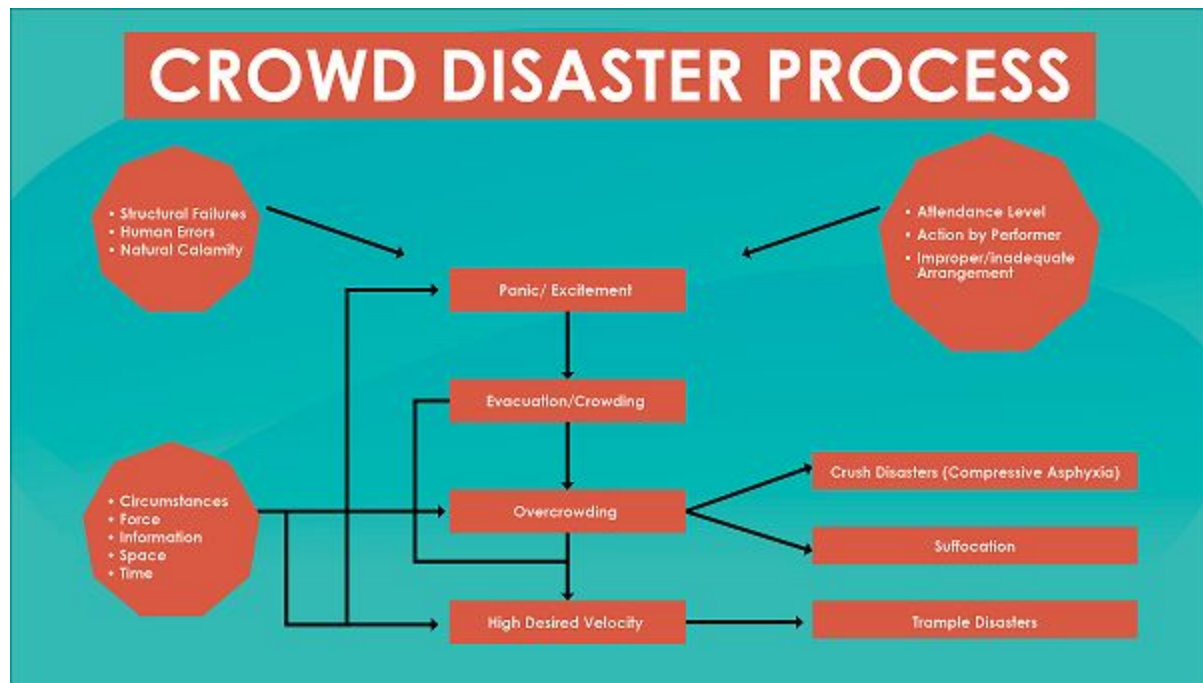
1. Educational
2. Critical
3. Suggestive

Before a disaster:

1. Bring to the attention of the authorities
2. Prepare the community and making them aware of Do's and Don'ts
3. Keeping a watch on anti-social elements, thereby helping in maintaining the law and order situation

During a disaster:

1. Broadcasting accurate information to stop rumours and hence reduce panic
2. Make people aware of their Do's and Don'ts to reduce further damage of a probable secondary risk
3. Can assist the authorities in reaching out to the victims and their families
4. Facilitate resource mobilization (funds) for relief operations



After a disaster:

1. Informing the people about the post-disaster rehabilitation measures for putting pressure on the authorities
2. Provide aid in investigating the causes of the disaster

3. Can help generate expert opinion through debates/discussions for better preparedness levels in future

Role of Science and Technology Disaster Mitigation and Prevention

1. Geographic information system
2. Radiofrequency identification
3. Radio, Television, SMS etc.

These all including other technologies and methods help in creating early warning systems, information dissemination, search and rescue, insurance processing etc.

Legal Provisions

1. Disaster Management Act, 2005
2. The Police Act, 1961
3. Kerala Police Act, 2011
4. UP Melas Act, 1938
5. Cinematograph Act, 1952
6. Delhi Cinematograph Rules, 1953

Disaster Prevention and Mitigation

Proper planning and mitigation measures can play a leading role in risk-prone areas in order to minimise the worst effects of hazards such as earthquakes, floods and cyclones. These are the key areas which should be addressed to achieve this objective:

- **Risk Assessment and Vulnerability Mapping:** Mapping and vulnerability analysis in a multi-risk structure will be conducted utilising Geographic Information System (GIS) based databases like the National Database for Emergency Management (NDEM) and National Spatial Data Infrastructure (NSDI).
- **Increasing Trend of Disasters in Urban Areas:-** Steps to prevent unplanned urbanization must be undertaken, with the plan of action formulated being given the highest priority. State Governments/UTs concerned on the other hand focus on urban drainage systems with special attention on non-obstruction of natural drainage systems.
- **Critical Infrastructure:-** Critical infrastructure like roads, dams, bridges, irrigation canals, bridges, power stations, railway lines, delta water distribution networks, ports and river and coastal embankments should be continuously checked for safety standards

with respect to worldwide safety benchmarks and fortified if the current measures prove to be inadequate.

- **Environmentally Sustainable Development:-** Environmental considerations and developmental efforts, should be handled simultaneously for ensuring sustainability.
- **Climate Change Adaptation:-** The challenges of the increase in the frequency and intensity of natural disasters like cyclones, floods and droughts should be tackled in a sustained and effective manner with the promotion of strategies for climate change adaptation and disaster risk reduction.



The topics internal security and disaster management are diverse and also important for both the prelims and the mains exams. These topics are also highly linked with current affairs. Almost every question asked from them is related to current events. So, apart from standard textbooks, you should rely on newspapers and news analyses as well for these sections.

First of all, let us take a look at the trend analysis of these two topics from the time of the pattern change to 2016:

The following table gives the worth of the total mark of questions that were asked through the years mentioned.

Subject	Subtopic	2013	2014	2015	2016
Disaster Management	Disaster Management	10	12.5	12.5	25
Security	Development and Extremism	10	0	12.5	12.5
Security	External Actors and Border Management	10	62.5	25	25
Security	Cyber Security and Money Laundering	35	0	25	12.5

Disaster Management for UPSC

- The topic is very dynamic and gaining prominence because every year, natural disasters such as floods, landslides, earthquakes, etc. occur.
- The recent cyclone Fani set an example for planned management of natural disasters by which huge human loss could be averted. Lessons can be drawn from it. This is a potential area for questions.
- Apart from natural disasters, man-made disasters such as fires, chemical spills, groundwater contamination, etc. are also to be studied.
- Stick to one standard textbook for the static part and refer to a good newspaper for the dynamic content.
- NDMA publications and NCERT Class XI textbook (Natural Hazards & Disaster Management) are major sources for this section.

For your reference, we are giving the questions that were asked from this topic in the UPSC exam in the last few years.

2013 UPSC question:

- How important is vulnerability and risk assessment for pre-disaster management? As an administrator, what are key areas that you would focus on disaster management?

2014 UPSC question:

- Drought has been recognised as a disaster in view of its party expense, temporal duration, slow onset and lasting effect on various vulnerable sections. With a focus on the September 2010 guidelines from the National disaster management authority, discuss the mechanism for preparedness to deal with the El Nino and La Nina fallouts in India.

2015 UPSC question:

- The frequency of earthquakes appears to have increased in the Indian subcontinent. However, India's preparedness for mitigating their impact has significant gaps. Discuss various aspects.

2016 UPSC question:

- With reference to the National Disaster Management Authority (NDMA) guidelines, discuss the measures to be adopted to mitigate the impact of the recent incidents of cloudbursts in many places of Uttarakhand.
- The frequency of urban floods due to high-intensity rainfall is increasing over the years. Discussing the reasons for urban floods. highlight the mechanisms for preparedness to reduce the risk during such events.

2017 UPSC question:

- In December 2004, the Tsunami brought havoc to 14 countries including India. Discuss the factors responsible for the occurrence of Tsunami and its effects on life and the economy. In the light of guidelines of NDMA (2010) describe the mechanisms for preparedness to reduce the risk during such events.

2018 UPSC question:

- Describe various measures taken in India for Disaster Risk Reduction (DRR) before and after signing 'Sendai Framework for DRR (2015-2030)'. How is this framework different from 'Hyogo Framework for Action, 2005'?

Internal Security

This topic can be subdivided into different subsections. Each of them is discussed briefly below.

Development and spread of extremism

- This is a very narrow topic but very important as Naxal issues are frequently seen in the news.
- You need to explore the relationship between poverty, lack of development, unemployment and the rise of left-wing terrorism such as Naxalism and Maoism. The issue's origins, development, the response of the government and current situation should be studied. Since this is a narrow topic, you can make good notes for them and refer to them as and when needed.
- Sources:
 - The Hindu newspaper
 - Institute for Defence Studies and Analyses (IDSA) website
 - Challenges to Internal Security of India by Ashok Kumar

A few questions that were asked in the UPSC mains from this topic are given below:

2013

- Article 244 of the Indian Constitution relates to the Administration of Scheduled areas and tribal areas. Analyze the impact of non-implementation of the provisions of the fifth schedule on the growth of Left Wing Extremism.

2015

- The persisting drives of the government for development of large industries in backward areas have resulted in isolating the tribal population and the farmers who face multiple displacements with Malkangiri and Naxalbari foci, discuss the corrective strategies needed to win the left-wing extremism (LWE) doctrine affected citizens back into the mainstream of social and economic growth.

2017

- The north-eastern region of India has been infested with insurgency for a very long time. Analyze the major reasons for the survival of armed insurgency in this region.

2018

- Left-Wing Extremism (LWE) is showing a downward trend, but still affects many parts of the country. Briefly explain the Government of India's approach to counter the challenges posed by LWE.

Cybersecurity, social media and internal security challenges, money-laundering

- This is a very relevant topic for the times. Many terrorists claim to have been influenced by social media sites and social media preachers for their terrorist acts.
- With easy accessibility and a wide reach, social media is proving to be a challenge in tackling crimes of all nature.
- Mob violence is also fuelled by social media messages that take no time to go viral.

A few UPSC questions are given for reference.

2013

- Money laundering poses a serious threat to the country's economic sovereignty. What is its significance for India and what steps are required to be taken to control this menace?
- What is a digital signature? What does its authentication mean? Give various salient built-in features of a digital signature.
- What are the social networking sites and what security implications do these sites present?
- Cyberwarfare is considered by some defence analysts to be a larger threat than even Al Qaeda or terrorism. What do you understand by Cyberwarfare? Outline the cyber threats which India is vulnerable to and bring out the state of the country's preparedness to deal with the same.

2015

- Religious indoctrination via digital media has resulted in Indian youth joining ISIS. What are ISIS and its mission? How can ISIS be dangerous for the internal security of our country?
- Considering the threats cyberspace poses for the country, India needs a "Digital Armed Force" to prevent crimes. Critically evaluate the National Cyber Security Policy, 2013 outlining the challenges perceived in its effective implementation.
- Discuss the advantages and security implications of cloud hosting of server vis-a-vis in-house machine-based hosting for government businesses.

2016

- Use of the Internet and social media by non-state actors for subversive activities is a major concern. How have these been misused in the recent past? Suggest effective guidelines to curb the above threat.

2017

- Discuss the potential threats of Cyberattack and the security framework to prevent it.

2018

- India's proximity to two of the world's biggest illicit opium-growing states has enhanced her internal security concerns. Explain the linkages between drug trafficking and other illicit activities such as gunrunning, money laundering and human trafficking. What countermeasures should be taken to prevent the same?
- Data security has assumed significant importance in the digitized world due to rising cybercrimes. The Justice B. N. Srikrishna Committee Report addresses issues related to data security. What, in your view, are the strengths and weaknesses of the Report relating to the protection of personal data in cyberspace?

Terrorism

- A very important topic and dynamic too.
- The newspapers are the most important sources for material. IDSA website is also a good source.
- Management of border areas, linkages between organised crime such as drug trafficking, kidnapping, human trafficking and their links with terrorism are to be studied.

UPSC questions on this topic from the past year papers are given below.

2013

- How far are India's internal security challenges linked with border management, particularly in view of the long porous borders with most countries of South Asia and Myanmar?

2014

- China and Pakistan have entered into an agreement for the development of an economic corridor. What threat does it dispose of for India's security? Critically examine.
- In 2012, the longitudinal marking of the high-risk areas for piracy was moved from 65° East to 78° east in the Arabian Sea by International Maritime organisation. What impact does this have on India's maritime security concerns?
- How illegal transborder migration does pose a threat to India's security? Discuss the strategies to curb this, bring out the factors which give impetus to such migration.
- The diverse nature of India as a multi-religious and multi-ethnic society is not immune to the impact of radicalism which has been in her neighbourhood. Discuss along with the strategies to be adopted to counter this environment.
- International civil aviation laws provide all countries complete and exclusive sovereignty over the airspace above the territory. What do you understand by airspace? What are the implications of these laws on the space above this airspace? Discuss the challenges which this poses and suggests ways to contain the threat.

2016

- Border management is a complex task due to difficult terrain and hostile relations with some countries. Elucidate the challenges and strategies for effective border management.
- The terms 'Hot Pursuit' and 'Surgical Strikes' are often used in connection with armed action against terrorist attacks. Discuss the strategic impact of such actions.
- "Terrorism is emerging as a competitive industry over the last few decades." Analyse the above statement.

2018

- The China-Pakistan Economic Corridor (CPEC) is viewed as a cardinal subset of China's larger 'One Belt One Road' initiative. Give a brief description of CPEC and enumerate the reasons why India has distanced itself from the same.