

The Hindu Important News Articles & Editorial For UPSC CSE

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India and Russia signed a working plan for their Joint Commission on Emergency Management for 2025-26, focusing on space monitoring, disaster response, and training.

- This agreement builds on past collaborations and aims to enhance bilateral cooperation in emergency preparedness and response, with the next meeting scheduled in India.

India-Russia Emergency Management Cooperation

➤ **Working Plan Agreement**

- India and Russia signed a working plan for the Joint Russian-Indian Commission on Cooperation in Emergency Management for 2025-26.
- The agreement was signed by Union Minister of State for Home Nityanand Rai and Russian Minister for Civil Defence, Emergencies, and Elimination of Consequences of Natural Disasters.

➤ **Historical Context**

- The agreement follows previous collaborations, including the Inter-Governmental Agreement (IGA) from December 2010 and the establishment of the Indo-Russian Joint Commission for Cooperation in 2013.
- The first meeting of this commission took place in New Delhi in 2016.

➤ **Areas of Cooperation**

- **Space Monitoring Technologies:** Implementation of space-based technologies for risk forecasting and emergency response.
- **Disaster Response Experiences:** Exchange of experiences in managing large-scale disasters.
- **Training:** Cooperation in training fire and rescue specialists.

➤ **Future Plans And Objectives**

- The working plan aims to enhance bilateral efforts, improve early warning systems, and boost capacity building in emergency preparedness, prevention, response, and planning.
- The agreement is intended to upgrade existing frameworks and support mutual assistance in enhancing emergency management capabilities in both countries.

India and Russia sign a working plan to handle emergencies

The Hindu Bureau
NEW DELHI

India and Russia on Wednesday signed the working plan of the Joint Russian-Indian Commission on the Field of Emergency Management for 2025-26.

Union Minister of State for Home Nityanand Rai and Kurenkov Aleksandr Vyacheslavovich, Minister of the Russian Federation for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM of Russia), signed the agreement in Moscow.

Both the countries agreed to implement the plan during 2025-26, and decided to continue exchange of the best practices and lessons learnt in the field of disaster management.

"This meeting is significant to draw a strategy for executing the previous agreements between India and Russia, such as, Inter-Governmental Agreement (IGA) for cooperation in the field of Emergency Management in December, 2010, and Regulation to establish the Indo-Russian Joint Commission for Cooperation (2013) in prevention and elimination of consequences of emergency situations," a statement from the Union Home Ministry said.

The first meeting of the commission was held in New Delhi in 2016.

"Within the overall framework of cooperation, the three specific issues were deliberated in the meeting – use of space monitoring technologies for risks forecasting and emergency response, exchange of experiences of responding to large-scale disasters, and cooperation in the field of training of fire and rescue specialists," the statement said.

It was decided that the next meeting of the commission will be held in India in 2026. This working plan will give added impetus to the bilateral efforts and pave the way for up-gradation, mutual assistance in enhancing early warning systems and capacity building of both the countries in emergency preparedness, prevention, response and planning, the Ministry said.

Ques : Recently, India signed a deal known as 'Action Plan for Prioritization and Implementation of Cooperation Areas in the Nuclear Field' with which of the following countries?

- (a) Japan
- (b) Russia
- (c) The United Kingdom
- (d) The United States of America

Ans: b)



- ▶ The Indian Ministry of Defence signed a contract in June 2024 for 73,000 SIG 716 rifles from Sig Sauer, U.S., with delivery expected by end-2025.
- ▶ These rifles will replace the indigenous INSAS rifles for frontline counter-insurgency operations.

India signs repeat order for 73,000 SIG 716 rifles; deliveries by 2025-end

Dinakar Peri
NEW DELHI

The Ministry of Defence has signed a repeat order for 73,000 SIG 716 rifles from Sig Sauer of the U.S. and deliveries are expected to be completed by end-2025.

“The contract was signed in June 2024 and delivery is within 18 months of contract,” a defence official said. The Army has earlier procured and inducted 72,400 SIG 716 rifles through fast-track procurement under a ₹700-crore contract signed in February 2019.

“We are proud to be a partner in the modernisation effort of the Indian Ar-



The Army has inducted 66,400 of the 72,400 SIG 716 assault rifles procured under a ₹700-crore deal in February 2019. FILE PHOTO

my, and prouder still that the SIG 716 rifle achieves the Ministry of Defence’s modernisation goals with the second largest Army in the world,” Ron Cohen, president and CEO, Sig Sauer, said in a statement

issued on August 26. “Since the initial fielding of the SIG 716, we have received phenomenal end-user feedback on the performance and reliability of the platform.”

The successful fielding

and overwhelming soldier acceptance led to this follow-on award for an additional 73,000 rifles, the company added.

The Army has for long been looking to replace the indigenous INSAS (Indian National Small Arms System) rifles in use with a modern rifle.

The Army has inducted 66,400 of the 72,400 SIG 716 assault rifles procured under the deal in February 2019 and these have been provided to frontline troops involved in counter-insurgency operations.

The SIG 716, weighing 3.82 kg, has an effective range of 600 m and is more capable and reliable than the INSAS in use.

SIG 716 Rifles:

- ▶ The SIG 716 is a modular, gas-operated, semi-automatic rifle manufactured by Sig Sauer.
- ▶ Weighing 3.82 kg, it features a 16-inch barrel and an effective range of 600 metres.
- ▶ Designed for reliability and versatility, it is equipped with a free-floating handguard, adjustable stock, and Picatinny rail for accessories.
- ▶ The rifle utilises a short-stroke piston system, enhancing its durability and performance under various conditions.
- ▶ Compared to the INSAS rifles, the SIG 716 offers improved accuracy, reliability, and modern features, making it suitable for both standard and counter-insurgency operations.
- ▶ It has been adopted by several military forces globally for its robust performance.

UPSC Mains PYQ : 2019

Ques : 'What introduces friction into the ties between India and the United States is that Washington is still unable to find for India a position in its global strategy, which would satisfy India's National self-esteem and ambitions'. Explain with suitable examples.



Page 07 : GS 3 : Disaster and disaster management

India is addressing its diverse natural hazards through improved disaster management and climate resilience efforts. Challenges include the need for better localised forecasts and effective implementation of climate research.

➔ Enhancing weather readiness involves bridging research with practical applications and building capacity for sector-specific disaster management solutions.

Wanted: a strategy to turn climate research into disaster management

Climate research's goals were once research papers and PhDs, but now it must meet people's needs by bringing science to society; govts. and disaster management agencies are depending on it, and sector-specific extension agents are necessary to bridge the research and administrative enterprises

Raghu Murtugudde

India is increasingly aware of the multiple location-specific natural hazards it is facing, each with a rapidly evolving risk landscape. These risks are a combination of weather events, vulnerabilities of the local population, and their exposure. Risks are best managed and mitigated with well-planned responses. The National Disaster Management Authority (NDMA) deserves the kudos it receives for its response to disasters and its help reducing their mortality and damage. But it also contends with many knowledge gaps and barriers in improving its operations to meet India's need to be weather-ready and climate-resilient.

Never cease to surprise
Most regions of India know by now to expect weather extremes in all seasons, including heatwaves, wildfires, heavy rains, landslides, droughts, and cyclones. The India Meteorological Department (IMD) tries to keep pace by improving its forecasts of all weather hazards, even if they tend to not be as local (in scale) as required to plan disaster responses. Skills can always improve.

Academic institutions and government research facilities play an important role in advancing process and predictive understanding, and improving predictions. They also continue to develop and implement novel approaches to downscaling global, coarse-resolution forecasts to hyperlocal scales for specific sectors.

Climate change manifests locally as cooler and warmer temperature trends over northern-central and peninsular India, respectively. But this hardly means we are spared from heatwaves. Similarly, rainfall extremes now occur not only during the monsoon season of June to September but also during the pre- and post-monsoons. Land that is weakly supported suffers more landslides as a result. Wildfires have also been reported to be on the rise.

Exacerbated to weather extremes
Vulnerability isn't entirely natural.

Thanks to India's population and economic growth, people are moving into more unsafe regions and establishing informal housing on unstable slopes and flood-prone areas. The more exotic of these places have invited more tourists, as a result of which the state sets up more infrastructure in these locales and encourages other economic activities, such as replacing forest cover with cash crops and plantations.

The recent landslides in Wayanad put such a dangerous mix of factors on full display.

Taken together, vulnerability is a combination of poverty and high population density with poor infrastructure in some places and wealth and unsafe development in others. Insurance coverage and/or policies could also be creating a moral hazard by incentivising people to increase their exposure to climate risks.

Ineffective translation
India continues to invest heavily in climate research, forecasts, and climate services. Climate services translate forecasts into support for decision-making in agriculture, water and energy resources, healthcare, transportation, and other sectors. But the uptake of this information has been remarkably low because it's either not as location- or sector-specific as it needs to be or there aren't enough people with the



A road damaged by a landslide triggered by heavy rain at Balugani in Shimla on August 21. Most regions of India now expect weather extremes in all seasons. PTI

right skills to use it.

Academia and many private ventures continue to push the limits of translating the IMD's forecasts into hyperlocal scales and to improve the skills to deliver value-added products for users. Even when specific products are generated at the scales and skill-levels required, operationalising them or providing them in a timely and routine manner remains a major hurdle. Two examples illustrate this problem.

(i) **Irrigation advisories:** Weather forecasts frequently are translated to farm-scale information to manage irrigation from days 1 to 5 and water arrangement information for up to 14 days. Experts combine farmers' inputs on their irrigation practices with data of soil properties, crop types, water requirements, and crop stress so that rainfall forecasts can inform decisions about whether there is sufficient water for irrigation and what the schedule should be.

The author was a part of one such decision-support tool developed for grape farmers in Nashik district.

The co-development of this solution with farmers showed that in both kharif and rabi seasons, up to 30% of water can be saved without any loss in crop yield. Now, large-scale operationalisation is required: farmers need to use this tool to document the usefulness and usability of irrigation advisories over a few years, so that the tool can be improved. This is planned in the form of an app where farmers can access data and provide continuous feedback to the researchers. The researchers can use this feedback to update the tool for other regions and other crops.

But engaging farmers in large numbers and developing the app requires the involvement of local governments, NGOs,

Climate services translate forecasts into support for decision-making. But the uptake of this information has been low because it is either not as location- or sector-specific as it needs to be or there are not many people with right skills to use it

and farmers organisations or cooperatives. One can see this as the purview of extension agencies that – if they exist – could translate research into daily, weekly, and seasonal agricultural operations.

Yet such bodies don't exist nor are we educating/training people to staff them. We also lack the funding structures required to set up research-to-operation programmes. At the same time there is an unmet need to support poorer farmers with the soil moisture and crop data they need to plan irrigation. Without these systems and skills, any plan to double farmers' incomes or ensure a minimum income for them will be impossible.

(ii) **Urban flood predictions:** We need to downscale predictions of heavy rainfall for the street level in cities for flood control. At present, municipalities are achieving this with inputs from municipal sensors and data from its weather stations.

However, the ideal situation looks like the following: flood managers will have to evaluate forecasts for a few seasons to ensure a downscaled forecast is actionable, and subsequently plan the allocation and operation of drainage pumps, traffic control units, bus/train routes, school closures, etc.

In this example, the flood managers need to be trusted employees of a government, an NGO or a private entity that tracks forecasts and their systematic biases as well

as human actions that exacerbate water logging.

Again, neither an academic setup nor the structure of urban governments allows us to translate downscaled forecasts to urban flood management and flood risk mitigation completely.

From research to operations
Climate research is currently too siloed for it to inform operations within a reasonable timeframe. Its goals were once research papers and PhDs, but now it needs to meet people's needs by bringing science to society. Governments and disaster management agencies are depending on it. We clearly need sector-specific extension agents as described above to bridge the research and the administrative enterprises. These agents will serve as links to co-develop effective solutions to make India weather-ready.

In fact, weather-readiness and climate-resilience have to be hyperlocal since the nation will only be as ready and resilient as the weakest link. This requires sustained financing of the research-to-operations systems required at each location and in each sector.

We also need to pay serious attention to capacity-building, i.e. to train sector-specific extension agents who can communicate in local languages and manage the effects of cultural idiosyncrasies on disaster management and risk mitigation. If this seems like an onerous task, remember that it's also necessary – to ensure India's development is sustainable and confers safety and security for all, including from the effects of climate change.

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Awareness and Challenges

- ➔ India faces a range of location-specific natural hazards, including heatwaves, wildfires, heavy rains, landslides, droughts, and cyclones.

- The National Disaster Management Authority (NDMA) is recognized for its effective disaster response and efforts to reduce mortality and damage.
- Despite its achievements, NDMA contends with knowledge gaps and barriers in improving its operations to enhance weather readiness and climate resilience.

Weather Extremes and Climate Change

- Indian regions experience weather extremes in all seasons, with phenomena such as heatwaves, wildfires, and rainfall extremes occurring outside the traditional monsoon period.
- Climate change impacts include cooler trends in northern-central India and warmer trends in peninsular India.
- Additionally, increased wildfires and landslides are being observed recently.

Vulnerability Factors

- Vulnerability is exacerbated by population and economic growth, with people moving to unsafe regions and informal housing in unstable or flood-prone areas.
- Increased tourism and infrastructure development in these regions contribute to the problem, as does the replacement of forest cover with cash crops.

Ineffective Translation of Climate Research

- India invests heavily in climate research and services to support various sectors, but uptake remains low due to insufficient location- or sector-specific information and inadequate skills for using it.
- Efforts to downscale global forecasts to hyperlocal scales are ongoing, but operationalizing these forecasts remains a major hurdle.

Case Studies of Implementation Issues

➤ **Irrigation Advisories:**

- Weather forecasts are used to provide farm-scale irrigation advice, which can save up to 30% of water without affecting crop yield.
- Large-scale implementation requires local government, NGOs, and farmer organisations for effective use and feedback collection. Current lack of extension agencies and funding structures hampers progress.

➤ **Urban Flood Predictions:**

- Effective urban flood management requires downscaled rainfall forecasts and coordination of drainage pumps, traffic control, and other city functions.
- Municipalities use sensors and weather data, but comprehensive flood management is constrained by inadequate research-to-operation systems and lack of trained personnel.

➤ **From Research to Operations**

- Climate research needs to transition from academic goals to practical applications for effective disaster management and climate resilience.
- There is a need for sector-specific extension agents to bridge the gap between research and operational needs, ensuring that solutions are tailored to local contexts.
- Sustained financing and capacity-building are essential for developing effective research-to-operations systems at local and sectoral levels.

Conclusion

- To ensure India's development is sustainable and safe, there must be a focus on improving weather readiness and climate resilience through better integration of research with practical applications.
- Training and deploying sector-specific extension agents who can communicate in local languages and manage cultural factors is crucial for effective disaster management and risk mitigation..

UPSC Mains PYQ : 2019

Ques : Vulnerability is an essential element for defining disaster impacts and its threat to people. How and in what ways can vulnerability to disasters be characterised? Discuss different types of vulnerability with reference to disasters.



Recent research reveals that personal care products in India contain harmful microplastics, including polyethylene and polycaprolactone.

- ➔ Despite claims of being “eco-friendly” or “natural,” many products contribute to plastic pollution, posing significant environmental and health risks.
- ➔ Improved policies are needed to manage and reduce microplastic contamination effectively.

Where Micro Plastic Found

➔ Definition of Microplastics

- Microplastics are small plastic particles under 5 millimetres in size. They include microbeads, which have a diameter under 5 millimetres, and are often used in personal care products like face washes and scrubs.

➔ Increasing Uses of Microplastics

- **Personal Care Products:** Microplastics, such as polyethylene (PE) and polypropylene, are commonly used in face washes, scrubs, and shower gels as exfoliating agents and to enhance ingredient delivery.
- **Pharmaceuticals:** Bioplastics like polycaprolactone are utilised as drug carriers due to their anti-ageing and antibacterial properties.

- ➔ **Consumer Goods:** Microplastics are found in various products including cleaning agents and cosmetics, often under labels like “natural” or “eco-friendly,” which can be misleading.

Adverse Impacts of Microplastics

- ➔ **Environmental Pollution:** Microplastics contaminate water bodies and soil, adversely affecting both aquatic and terrestrial ecosystems.
- ➔ **Impact on Wildlife:** Marine organisms ingest microplastics, leading to disruptions in food chains and harm to wildlife.
- ➔ **Health Risks:** Microplastics are found in human tissues, such as the brain, blood, lungs, and digestive system, raising concerns about potential health impacts.
- ➔ **Bioaccumulation:** Microplastics can accumulate in human and animal bodies, leading to unknown long-term health effects.
- ➔ **Greenwashing:** Products labelled as “organic” or “eco-friendly” may still contain microplastics, misleading consumers about their environmental impact.
- ➔ **Complicated Efforts:** Greenwashing undermines efforts to reduce plastic pollution and complicates the pursuit of product transparency and environmental responsibility.



Around 23.33% of products contained cellulose microbeads. PRAVEEN KUMAR MATHIWANAN/UNSPASH

‘High amount of microplastics in Indian personal care products’

Privall Prakash

Personal care products (PCP) like face wash and shower gels in India contain a significant amount of harmful microplastics, new research has revealed. According to a study published in the *Emerging Contaminants* journal and led by Riya K. Alex, a third-year PhD scholar at the Cochin University of Science and Technology, polyethylene (PE) is the dominant polymer in microplastic emissions from PCPs. Microplastics are plastic particles are under 5 mm in size; microbeads have a diameter under 5 mm in diameter. The researchers analysed 45 samples of PCP in face washes, face scrubs, shower gels, and body scrubs available in

The study noted that labels like ‘organic’, ‘natural’, and ‘eco-friendly’ constitute a form of ‘greenwashing’

India and manufactured in 2022. The study focused on products marketed as “eco-friendly”, “natural” or “organic” to scrutinise the legitimacy of these claims. Around 23.33% of products contained cellulose microbeads and their biodegradability was unclear. Most microbeads were coloured white while green were the rarest. According to the researchers, white microbeads are more easily concealed in PCP. These orb-like particles are used as exfoliating agents and to enhance the delivery of active ingredients in the PCP. They are made of PE, polypropylene or and polyester. PE was present in the highest concentration in more than half the microbeads. In 30 grams of each kind of product, researchers found 0.26 g, 0.9 g, 1.24 g, and 1.74 g of microbeads in face washes, face scrubs, body scrubs, and shower gels, respectively. The average sizes of microbeads in the samples under study were 640.74 micrometre, 452.45 micrometre, 556.66 micrometre and 606.30 micrometre for face washes, face scrubs, body scrubs, and shower gels, respectively. The research also found polycaprolactone, a type of bioplastic, in two of the tested samples. Polycaprolactone is become more popular in pharmaceuticals as a carrier of drugs and for its anti-ageing and antibacterial constituents, but scientists it also know malforms aquatic biota. The researchers’ paper also noted that labels like “organic”, “natural”, and “eco-friendly” thus constitute a form of greenwashing and said brands rely on consumers to not scan the ingredient lists in detail. They also said the blend of natural ingredients and plastics in the same product challenges tests to identify the presence of plastic. The U.S., the U.K., Canada, France, and New Zealand have banned the production and sale of products with microbeads but it remains an ambiguous issue in India. A recent study by Toxics Link, an environmental research and advocacy NGO, found 6.71 to 89.15 pieces of microplastics per kilogramme of dry weight of salt and sugar, sized 0.1-5 mm. Microplastics have also been found in the human brain, blood, lungs, colon, placenta, testicles, and stool. The study paper advocated for better policies to control microplastic pollution in India and suggested coffee, apricots, walnut, kiwi seeds, and soluble cellulose beads could replace microbeads in PCPs.

UPSC Mains PYQ : 2019

Ques: How can the mountain ecosystem be restored from the negative impact of development initiatives and tourism?

Scheme In News : Pradhan Mantri Jan Dhan Yojana

On August 28, 2014, the Pradhan Mantri Jan Dhan Yojana (PMJDY) accomplished a decade, marking a significant milestone in financial inclusion.



About Pradhan Mantri Jan Dhan Yojana (PMJDY):

- **Launch date:** August 28, 2014
- **Objective:** To promote financial inclusion by providing access to financial services, including banking/savings accounts, remittance, credit, insurance, and pensions, affordably.
- **Significance:** Forms the backbone for several government economic initiatives and facilitates Direct Benefit Transfers (DBTs).
- **Eligibility:**
 - The applicant should be an Indian National.
 - The applicant should be aged between 18 and 59 years.
 - If minors above ten years apply, they will require support from their legal guardians to administer their PMJDY account.
- **Jan Dhan Account:**

- An individual can open an account under this scheme with any bank branch or Business Correspondent (Bank Mitra) outlet.
- Accounts opened under PMJDY can be opened with zero balance. However, if the account holder wishes to get a chequebook, she/he will have to fulfil the minimum balance criteria.
- The account holders under this scheme will be given a RuPay debit card which can be used across all ATMs for cash withdrawal.
- ➔ **Scheme highlights:**
 - **Zero-balance accounts:** Accounts can be opened with no minimum balance requirement.
 - **RuPay debit card:** Provides a free RuPay debit card with in-built accident insurance coverage.
 - **Accident insurance:** Up to ₹2 lakh.
 - **Life insurance:** Up to ₹30,000 for eligible first-time account holders.
- ➔ **Overdraft facility:**
 - Up to ₹10,000 is available to one account per household, with an additional ₹5,000 loan after six months of satisfactory account activity.
 - **Coverage focus:** 6% of accounts are in rural and semi-urban areas, with 55.6% of account holders being women.
 - **Banking access:** 95% of inhabited villages have banking facilities within a 5 km radius.
- ➔ **Recent developments:**
- ➔ **Account growth:**
 - Accounts increased from 72 crore in March 2015 to 53.13 crore by August 2024.
 - Deposits in PMJDY accounts surged from ₹15,670 crore (March 2015) to over ₹2.31 lakh crore (August 2024).
 - **Financial Year 2024-25 target:** The government aims to open an additional 3 crore PMJDY accounts.
 - **Operative accounts:** Out of 173 crores CASA accounts in the country, over 53 crores are PMJDY accounts, with an 80% operation rate.

Page : 08 Editorial Analysis

Sharpening India's anti-tuberculosis fight

The omnipresence of tuberculosis (TB) in the pages of history and literature is testimony to how the disease has plagued generations across the world and continues to be a major problem even today. India bears over a quarter of the global TB burden. Political will in India has helped drive a great deal of progress in the fight against the disease. For example, in 2023, addressing the big challenge of 'missed' TB cases, 25.1 lakh patients were diagnosed in India as having TB, highlighting strengthened case finding efforts. However, as we work toward the goal of TB elimination – the Prime Minister has urged citizens to work towards TB elimination – we must look to innovate and deploy proven technologies and tools at our disposal.

Regimens and issues

The first low-hanging fruit that I believe must be invested in urgently is new shorter regimens for drug-resistant TB. It has been encouraging to learn that India will soon introduce the World Health Organization (WHO)-recommended shorter regimen for drug-resistant TB. The current regimens on offer are long and arduous, requiring patients to consume nearly 13 to 14 tablets every day if they are on the shorter nine to 11-month regimen, or four to five tablets every day if they have been put on the 18 to 24 month longer regimen. The treatment is physically and psychologically draining and has severe side effects, such as loss of hearing, and even psychosis.

Moreover, a problem with such an extended treatment regimen that requires regular visits to a TB clinic for nearly two years is loss of



Dr. Randeep Guleria

Chairman of the Institute of Internal Medicine and Respiratory and Sleep Medicine at Medanta, Gurugram, and a former Director of the All India Institute of Medical Sciences, New Delhi

With the availability of game-changing new treatments, India must recast its TB-elimination programmes

employment, driving many families into poverty.

In 2022, WHO recommended the shorter, safer and more effective regimens called BPaL/M for all drug-resistant TB patients, and there is a lot of recent data that show this regimen to be more effective with better compliance. With only three to four tablets every day, patients can complete their treatment within six months, with minimal side effects. The success rates of this regimen are also reported to be higher – 89% as compared to the 68% treatment success rate reported in the country in the 2023 India TB Report. Given its efficacy, close to 80 countries around the world have already procured the BPaL/M regimen and about 20 of the highest burden countries are already rolling it out.

Research indicates that savings from implementing this regimen will be between 40% to 90% of the cost of current treatment regimens, and that an immediate transition to BPaL/M could result in an annual saving of approximately \$740 million (or approximately ₹6,180 crore) for health systems globally. This is a more effective and safer solution to treat drug-resistant TB and we must work on expediting access to this regimen to all eligible patients across the country.

Making the best use of new treatments

The next question is this. How do we go about diagnosing more people with TB so that they can benefit from these game-changing new treatments? The answer lies in making sure that we are screening and testing quickly and efficiently to reduce delays in accurate diagnosis. For this, a proactive approach is essential. It is time we modernised and used health datasets,

which include GIS mapping, to identify vulnerable populations such as those with comorbidities (for example, malnutrition, diabetes and HIV), former COVID-19 patients, and at-risk communities in slums, prisons, or those who are homeless. Targeted multi-disease focused screening drives can then be conducted to detect TB cases early, even among those without typical symptoms.

In fact, recent evidence highlights that a significant number of people with pulmonary (i.e., lung) TB may not exhibit recognisable symptoms such as cough, fever, weight loss, or night sweats. The National TB Prevalence Survey (2019-21) highlights the importance of chest X-rays, which detected 42.6% of cases that would have otherwise been missed. Leveraging advancements in technology, portable X-ray machines equipped with AI-driven tools can significantly reduce diagnostic delays, especially in remote and under-resourced areas.

Further, there is a critical need to expand the use of rapid molecular tests over less sensitive microscopy methods for faster detection and drug resistance profiling. This shift is crucial in promptly identifying TB cases and determining appropriate treatment options. In short, by proactively identifying at-risk populations and investing in and leveraging advanced/innovative diagnostic technologies, we can improve TB detection rates, reduce delays, and enhance treatment outcomes.

As we look to eliminate tuberculosis and make our country TB-free, prioritising these essential areas will be critical as these will be an investment in a healthier future for all of us.

GS Paper 02 : Social Justice – Health

(UPSC CSE (M) GS-2 : 2021) “Besides being a moral imperative of a Welfare State, primary health structure is a necessary precondition for sustainable development.”
(150 w/10m)

UPSC Mains Practice Question Discuss the challenges and potential solutions in India's fight against drug-resistant tuberculosis (TB), with a focus on shorter treatment regimens and innovative diagnostic approaches. (150 w /10 m)

Context :

- This article discusses India's ongoing battle against tuberculosis (TB), which accounts for over a quarter of the global TB burden.
- It emphasises the need for shorter, more effective treatments for drug-resistant TB, improved diagnostic methods, and innovative approaches to early detection for the goal of TB elimination.

Tuberculosis: A Persistent Challenge

- Tuberculosis (TB) remains a global health concern, with India bearing over 25% of the world's TB cases.
- Despite progress driven by political commitment, eliminating TB requires innovative solutions and improved use of existing technologies.
- In 2023, 25.1 lakh TB cases were diagnosed in India, indicating stronger case-finding efforts.

Current Treatment Regimens and Challenges

- Existing treatments for drug-resistant TB are long and difficult, with patients needing 13-14 tablets daily for shorter regimens (9-11 months) or 4-5 tablets daily for longer regimens (18-24 months).
- These treatments are physically and mentally taxing, with severe side effects, such as hearing loss and psychosis.
- The extended duration of treatment leads to job loss, pushing families into poverty, highlighting the need for more efficient regimens.

New Shorter Regimen: BPAL/M

- The WHO recommended a shorter, safer, and more effective regimen known as BPAL/M for drug-resistant TB in 2022.
- The BPAL/M regimen requires only 3-4 tablets per day, with treatment completion in six months and minimal side effects.
- Success rates for BPAL/M are higher at 89%, compared to 68% in the 2023 India TB Report.
- Many countries have adopted BPAL/M, and studies suggest it can save between 40% to 90% of the cost of current regimens.
- Immediate implementation of BPAL/M could save global health systems approximately ₹6,180 crore annually.

Improving TB Diagnosis

- Early and accurate diagnosis is essential for patients to benefit from advanced treatments like BPAL/M.
- Screening and testing methods need to be modernised for quicker and more efficient detection.
- Utilising health datasets and GIS mapping can help identify vulnerable populations, such as those with comorbidities, former COVID-19 patients, or those in high-risk communities (e.g., slums and prisons).

Importance of Proactive Screening

- Multi-disease-focused screening drives can help detect TB cases early, even in individuals without typical TB symptoms (e.g., cough, fever).
- The National TB Prevalence Survey (2019-21) shows that 42.6% of cases were detected through chest X-rays, which may have otherwise been missed.
- Portable X-ray machines, equipped with AI-driven tools, can help reduce delays in TB diagnosis, especially in remote and under-resourced areas.

Expanding Rapid Diagnostic Methods

- There is a critical need to shift from less sensitive microscopy methods to rapid molecular tests for faster detection and profiling of drug resistance.
- Faster diagnostic methods will improve TB detection rates and lead to better treatment outcomes, as they allow early intervention with the most appropriate treatments.

Conclusion:

- Eliminating TB in India requires prioritising shorter, more effective regimens like BPaL/M, improving diagnostic methods, and using innovative technologies for early detection.
- These actions are crucial investments in building a healthier future and achieving the goal of a TB-free India.

Current status of TB in India:

- **Incidence Rate:** As of 2022, the incidence rate of TB in India was reported at 199 cases per 100,000 population, a decline from 237 per lakh population in 2015. This reflects a 16% decrease in new TB cases since 2015.
- **Prevalence:** The estimated prevalence of tuberculosis infection (TBI) among individuals over 15 years of age was around 31% according to a national survey conducted from 2019 to 2021.
- **Global Contribution:** India accounted for approximately 26% of the global incidence of TB cases in 2020. In that year, India also represented 38% of global TB deaths among HIV-negative individuals.
- **Mortality Rate:** The mortality rate due to TB decreased from 28 per lakh population in 2015 to 23 per lakh population in 2022, indicating progress in managing the disease.
- **Total Cases:** Estimates suggest that the total number of TB cases in India has increased from 2.2 million to 2.6 million in recent years, reflecting ongoing challenges in detection and treatment.

What is Tuberculosis?

- **About:**
 - Tuberculosis is a bacterial infection caused by *Mycobacterium tuberculosis*. It can practically affect any organ of the body. The most common ones are the lungs, pleura (lining around the lungs), lymph nodes, intestines, spine, and brain.
- **Transmission:**

- It is an airborne infection that spreads through close contact with the infected, especially in densely populated spaces with poor ventilation.
- ➔ **Symptoms:**
 - Common symptoms of active lung TB are cough with sputum and blood at times, chest pains, weakness, weight loss, fever and night sweats.
- ➔ **Infection Prevalence:**
 - Every year, 10 million people fall ill with TB. Despite being a preventable and curable disease, 1.5 million people die from TB each year – making it the world's top infectious killer.
 - TB is the leading cause of death of people with HIV and also a major contributor to antimicrobial resistance.
 - Most of the people who fall ill with TB live in low- and middle-income countries, but TB is present all over the world. About half of all people with TB can be found in 8 countries: Bangladesh, China, India, Indonesia, Nigeria, Pakistan, Philippines and South Africa.
- ➔ **Treatment:**
 - TB is treated with a standard 6-month course of 4 antimicrobial drugs that are provided with information, supervision and support to the patient by a health worker or trained volunteer.
 - Anti-TB medicines have been used for decades and strains that are resistant to 1 or more of the medicines have been documented in every country surveyed.
 - Multidrug-resistant Tuberculosis (MDR-TB) is a form of TB caused by bacteria that do not respond to isoniazid and rifampicin, the 2 most powerful, first-line anti-TB drugs.
 - MDR-TB is treatable and curable by using second-line drugs such as bedaquiline.
 - Extensively drug-resistant TB (XDR-TB) is a more serious form of MDR-TB caused by bacteria that do not respond to the most effective second-line anti-TB drugs, often leaving patients without any further treatment options.
- ➔ **Drugs for TB:**
 - **Isoniazid (INH):** This drug is a cornerstone of TB treatment and is highly effective against *Mycobacterium tuberculosis*.
 - It works by inhibiting the synthesis of mycolic acids in the bacterial cell wall.
 - **Rifampicin (RIF):** Another essential drug in TB treatment, rifampicin works by inhibiting the synthesis of RNA in the bacteria.
 - It is often used in combination with other drugs to treat TB and is crucial for preventing the development of drug resistance.
 - **Delamanid:** Delamanid is a newer drug that is used in the treatment of multidrug-resistant TB (MDR-TB) and is often used in combination with other drugs.

What are Different Initiatives to Combat TB?

- ➔ **Global Efforts:**
 - The WHO (World Health Organisation) has launched a joint initiative "Find. Treat. All. #EndTB" with the Global Fund and Stop TB Partnership.

- WHO also releases the Global Tuberculosis

Report.

- The Global Plan to End TB, 2023-2030: It is a plan for ending TB as a public health challenge by 2030. It provides a blueprint of priority actions required and a detailed estimate of the financial resources needed to end TB.
 - It is a goal that has been adopted by all Member States of the United Nations (UN) and the WHO.
 - The End TB Strategy builds on and significantly expands the scope of efforts in the context of the United Nations Sustainable Development Goal 3.3.
- ➔ **India's Efforts:**
- Pradhan Mantri TB Mukh Bharat Abhiyan
 - National Strategic Plan (NSP) for Tuberculosis Elimination (2017-2025)
 - TB Harega Desh Jeetega Campaign
 - Nikshay Poshan Yojna
 - **RePORT India:** RePORT India (Regional Prospective Observational Research for Tuberculosis (TB)) is a bilateral, multi-organizational, collaborative effort established in 2013 under the Indo-US Vaccine Action Program (VAP).
 - It aims to address the threat of TB to the people of India and across the globe.

Shanghai Cooperation Organization

- The membership of SCO has expanded since 2001, and it currently has eight member states.
- **1996:** 'Shanghai Five' established by Kazakhstan, China, Kyrgyzstan, Russia, and Tajikistan.
- **2001:** After adding Uzbekistan in 2001, the Shanghai Five was renamed the SCO.
- **2015:** At Ufa, Russia, the SCO decided to admit India and Pakistan as full members.
- **2016:** India and Pakistan signed the memorandum of obligations in Tashkent (Uzbekistan), thereby starting the formal process of joining the SCO as full members.
- **2017:** At Astana, India and Pakistan officially joined SCO as full members
- **2021:** It was announced that Iran would become a full member of the SCO.



Members

China, India, Kazakhstan, Kyrgyzstan, Russia, Pakistan, Tajikistan, Iran, and Uzbekistan

Observers	Afghanistan, Belarus, and Mongolia
Dialogue Partners	Armenia, Azerbaijan, Cambodia, Sri Lanka, Turkey, Egypt, Nepal, Qatar, and Saudi Arabia

Shanghai Cooperation Organization Objectives

- SCO stands for "Shanghai Cooperation Organization". It is an intergovernmental political, economic, and security alliance founded in 2001 by Kazakhstan, China, Kyrgyzstan, Russia, Uzbekistan, and Tajikistan. The first summit was held in Shanghai, China, in 2001.
- The SCO aims to promote cooperation and mutual support in areas such as trade, investment, energy, transportation, and security.
- The Shanghai Spirit is the core value of the SCO. It is about mutual trust, mutual benefit, equality, consultation, respect for cultural diversity, and the pursuit of common development among the SCO members.
- The official working language of the SCO Secretariat is Russian and Chinese.
- The main objectives of SCO are:
 - Strengthen relations among member states.
 - Promote cooperation in political affairs, economics, and trade, scientific-technical, cultural, and educational spheres as well as in energy, transportation, tourism, and environmental protection.
 - Safeguard regional peace, security, and stability.
 - Create a democratic, equitable international political and economic order.

Shanghai Cooperation Organization Significance

- **Areas of Cooperation:** The SCO has mainly focused on regional security issues, its fight against regional terrorism, ethnic separatism, and religious extremism, and promoted regional development.
- **Accommodating large population and world GDP:** It covers 40% of the global population, nearly 20% of the global GDP and 22% of the world's land mass.
- **Strategic significance:** The SCO has the potential to act as a catalyst for achieving regional integration among Asian countries and promoting stability across borders. Additionally, the SCO's efforts can foster improved connectivity throughout its area.
- **Bulwark against terrorism and drug trafficking:** It has focused not only on counter-terrorism but also on drug trafficking, military cooperation, and economic collaboration.
- **Comparison with QUAD:** SCO has displayed a much greater capacity to advance shared military and security goals through its range of initiatives such as "Peace Mission" drills that involve all members than the reformed Quad has been able to do thus far.