NEXT IAS

SUMMARY OF
DOWN TO EARTH

[01–15 October, 2024]

PRELIMS

Subjective Questions

MCQS

PERFORMANCE REVIEW OF PMJAY

Context:

The Union government recently announced plans to extend the benefits of the publicly funded national health insurance scheme, Pradhan Mantri Jan Arogya Yojana (PMJAY), to all Indian citizens aged 70 years and above.

About the PM-JAY

- It is a flagship health insurance scheme launched under the **Ayushman Bharat** initiative, designed to provide financial protection against health-related expenses, particularly for the underprivileged sections of society.

- It represents an evolution from the previous **Rashtriya Swasthya Bima Yojana (RSBY)** and was earlier known as the **National Health Protection Scheme (NHPS)**, extending its coverage to families included in RSBY but excluded from the **Socio-Economic Caste Census (SECC) 2011** database.

- It is administered by the **National Health Authority (NHA)**, which coordinates with **State Health Agencies** (SHAs) to ensure proper implementation.

- The **Central Government** bears **60% of the cost** of the scheme, while **State Governments** bear the remaining **40%**.
  - It ensures uniform coverage across the country, irrespective of regional variations in healthcare costs.

Scope and Coverage

- PM-JAY is the **largest health assurance scheme in the world**, covering **12 crore families** (approximately **55 crore beneficiaries**), which constitutes around **40% of India's population**.

- It offers **₹5 lakh** annual health coverage per family for **secondary** and **tertiary care hospitalization**, and covers major surgeries, advanced medical treatments, and critical care services across public and private hospitals.

Eligibility and Target Beneficiaries

- PM-JAY primarily targets the most vulnerable segments of society, specifically **economically weaker families** identified using the **Socio-Economic Caste Census (SECC) 2011**.

- In **rural areas**, the households are selected based on **deprivation criteria**, including families without shelter, manual laborers, and those without formal sources of income.

- In **urban areas**, occupational categories such as street vendors, domestic workers, and sanitation workers are used to identify eligible households.
  - Families that were earlier part of **RSBY**, even if not included in SECC 2011, are also covered under PM-JAY.

Measuring Success: WHO and World Bank Recommendations

- The **World Health Organization (WHO)** and the **World Bank** recommend two indicators to monitor the success of UHC:
  - **Financial Protection**: Measured by **out-of-pocket expenditure**, **catastrophic health expenditure**, and **healthcare-induced impoverishment**.

○ **Service Coverage**: Assessed through a **service coverage index**, which evaluates the availability of health services for various conditions, including both outpatient and inpatient care.

Performance and Deficiencies of PM-JAY

● A **Comptroller and Auditor General (CAG)** report in 2023 highlighted several deficiencies in PM-JAY's implementation.

○ Issues included **non-functioning equipment**, inadequate bed strength, lack of **emergency transport services**, and **copayments** imposed on patients beyond insurance coverage.

● The **paucity of well-equipped hospitals** in **Tier-2** and **Tier-3 cities** limits the scheme's reach in certain areas.

○ This issue became evident during the **COVID-19 pandemic**, when private hospitals, especially in smaller cities, were reluctant to participate fully in the administration of vaccines due to capacity constraints and low government reimbursement rates.

● **Private hospitals** have shown some reluctance to fully engage with PM-JAY, particularly due to **payment delays** and low reimbursement rates for services.

HUMAN-WILDLIFE CONFLICT

Context:

Recently, the Uttar Pradesh government launched an operation to capture the wolves responsible for several deaths in Bahraich to address human wildlife conflict.

About the Human-animal conflict

● It refers to interactions between humans and wildlife that result in negative consequences, such as injury, death, or damage to property and ecosystems. These can occur when animals and humans share the same space and resources, leading to dangerous encounters.

Rising Conflict in Rural and Forested Areas

● In many of India's **rural** and **forested** regions, human-wildlife conflicts are on the rise.

● These areas, which were once dominated by wildlife, are now seeing increased human activity due to **population growth** and **expansion of agriculture** into **wildlife territories**.

● This expansion forces animals such as **tigers, elephants, leopards**, and **wolves** into close proximity with human settlements.

ADDITIONAL INFORMATION

● India is home to two subspecies of wolves:

○ The **Himalayan (Woolly) wolf** (**Canis Lupus Chanco**) found in the **trans-Himalayan** region.

○ The **Indian peninsular (common) wolf** (**Canis lupus pallipes**) which once roamed across **Pakistan, India,** and **Bangladesh**.

● Although there is no **official data** on the wolf population, experts estimate that **2,000-3,000 individuals** remain in India.

● Wolves typically do not attack

humans, and even in areas with a high density of wolves, there is rarely any record of them **killing people or children**.

Rise in Human-Wolf Conflict in Mahsi Region

- **Geographical Context: Mahsi's Location in the Terai Region:** Mahsi, located in the **Terai region**, which spans the marshy lowlands along the **southern Nepal** and **northern India** border, has historically experienced incidents of animal attacks.

- **Climate Change and Habitat Disruption**

- One theory attributes the rise in wolf attacks to the **inundation of the Ghaghara river**, which flows through Bahraich.

- Due to **climate change**, the river has experienced more frequent flooding during the monsoon seasons, which has disrupted the natural **wolf habitat**.

- This disruption forces wolves out of their territory and into **human settlements** in search of food, leading to more frequent encounters with humans.

Expansion of Sugarcane Cultivation

- Another contributing factor is the rapid **expansion of sugarcane cultivation** along the riverbanks in Bahraich.

- **Sugarcane fields** provide both a breeding ground for wildlife and a

hiding place after a hunt.

- **Government** data supports this theory: in **2003-04**, the area under sugarcane cultivation in Bahraich was approximately **18,989 hectares**.

- By **2023-24**, this figure had soared to about **80,000 hectares**, reflecting a **350% increase**. This expansion has allowed wolves to come into closer proximity with human populations.

Key Causes of Human-Wildlife Conflict

- **Habitat Loss and Fragmentation:** Rapid **urbanization**, **deforestation**, and the expansion of **agriculture** are major drivers of **habitat loss** for wildlife. As natural habitats shrink, animals are forced into closer contact with human populations.

- **Human Encroachment:** As humans construct homes, farms, and roads closer to **wildlife habitats**, the boundary between human and animal spaces becomes increasingly blurred.

  - This increases the chances of large animals like **elephants**, **tigers**, and **leopards** wandering into villages or towns, often causing **property damage** or posing direct threats to people.

- **Competition for Resources: Scarcity of food or water** in natural habitats forces wildlife to venture into human-dominated areas in search of these resources.

  - This competition often leads to conflict as animals disrupt agricultural fields, raid crops, or prey on livestock.

- **Climate Change:** It can disrupt ecosystems by altering the availability of **food** and **water**. As these resources become scarce in traditional wildlife areas, animals are pushed into human environments, increasing the likelihood of conflict.

- **Revenge or Retaliatory Killing:** Local communities often respond to wildlife attacks on their livestock with **revenge killings**.

  - This retaliatory behavior worsens the conflict and can further threaten already **endangered species**.

- **Agricultural Expansion:** The spread of **agriculture** into previously wild areas disrupts natural wildlife corridors.

- In regions where fertile land overlaps with these corridors, animals like **elephants** may raid crops, while **large carnivores** such as tigers or leopards increase predation on livestock that intensifies human-animal interactions, causing conflicts over resources.

Way Forward

- **Strengthen Habitat Conservation and Restoration**: Focus on preserving natural habitats and creating wildlife corridors to minimize encroachment on human settlements.

  - Restoring degraded ecosystems and maintaining buffer zones can reduce conflicts by allowing animals to roam freely without entering human territories.

- **Promote Coexistence Initiatives**: Encourage community-driven approaches to coexistence. This includes educating local populations about animal behavior, effective mitigation techniques, and the importance of biodiversity conservation.

  - Eco-tourism and compensation schemes for affected communities can also promote harmonious living.

- **Develop Early Warning and Monitoring Systems**: Implement advanced monitoring technologies, like drones, camera traps, and GPS tracking, to detect wildlife movements near human settlements.

  - Early warning systems can alert communities in advance, allowing for timely interventions to prevent conflicts.

- **Wildlife Relocation and Rehabilitation Programs**: In cases where conflicts are recurring, relocating problem animals to protected areas or engaging in wildlife rehabilitation efforts can help mitigate dangerous interactions.

  - Care must be taken to balance population control measures with conservation needs.

- **Leverage Traditional Knowledge and Modern Science**: Integrating indigenous practices that have been historically used to mitigate human-animal conflicts with modern conservation science can yield effective solutions tailored to specific regions and species.

PACT FOR THE FUTURE

Context:

Recently, the UN General Assembly approved the 'Pact for the Future' during the Summit of the Future held in New York.

Overview of the Pact

- **Adoption and Purpose**: The Pact was adopted without a formal vote, reflecting a unified global commitment to addressing key global challenges through a new multilateral framework.

  ○ It aims to create a **"step-change"** in how global governance operates by making it more effective, inclusive, and interconnected.

- **56 Action Points**: The Pact outlines **56 action points** that focus on addressing a wide array of global challenges, including **Sustainable development** by 2030; **Climate change**; **Peace and security**; **Governance reforms**; **Gender equality**; **Needs of future generations** and **Reinforcing Existing Agreements etc.**

Focus of the Summit: "How" to Achieve Change

- **Beyond "What", to "How"**: While many existing agreements like the SDGs set out the **"what"**—i.e., the specific targets and goals—this **Summit of the Future** focused on the **"how"**.

  ○ The emphasis is on finding actionable, collaborative ways to meet global challenges while preparing for the future.

- **Negotiation Process**: The negotiations for the Pact spanned **nine months**,

initiated by a "zero draft" released on January 26, 2024, by **Germany** and **Namibia**, who acted as co-facilitators of the summit.

  ○ The draft underwent **four revisions** based on feedback from diverse stakeholders, ensuring the final document addressed the varied concerns of different nations.

- **Reaffirmation of Multilateralism:** At a time when many countries are questioning the relevance of multilateralism, the Pact reaffirms the global community's commitment to this principle.

  ○ Multilateralism is vital for addressing global issues that no country can solve alone, such as climate change, pandemics, and security threats.

  ○ The global landscape is increasingly polarized, with **wealthy nations** focusing on protectionist policies that prioritize national interests.

Concerns About Unilateralism

- A notable shift towards unilateral actions has been observed in recent years. It was evident during the **2021 UN Environment Assembly**, where countries voiced concerns about increasing inward-looking policies, like **vaccine nationalism** and **trade protectionism**.

  ○ Such policies not only hamper global cooperation but also hinder efforts to address environmental challenges, which require coordinated international solutions.

- **Triple Environmental Emergency**: UN Secretary-General **António Guterres** described the current global situation as a **"triple environmental emergency"**, referring to the combined crises of:
  - **Climate change**: Rising temperatures and environmental degradation.
  - **Biodiversity loss**: The rapid decline of species and ecosystems.
  - **Pollution**: The growing burden of waste and harmful emissions. Guterres emphasized that these interconnected issues could only be solved through renewed global cooperation and a collective approach to governance.

Key Elements of the Pact

- **Strengthening the UN's Role**: The Pact emphasizes the need to bolster the multilateral system with the **UN** at its core.
  - It highlights the importance of giving the UN a more central role in managing global challenges, particularly in the areas of peace, security, and sustainable development.
- **Greater Representation for Developing Nations**: Countries from the **Global South** pushed for increased representation in key international bodies, such as the **UN Security Council** and multilateral development banks.
  - These nations argue that global governance structures need to better reflect the realities of the modern world, where developing

countries are major players in the global economy.

- **Financial Support for Climate Action**: The Pact also addresses the urgent need for financial support to help vulnerable nations deal with the impacts of climate change, particularly in terms of **loss and damage** caused by extreme weather events.
- **Sustainable Development and Climate Action**: **Accelerated Progress Toward SDGs**: The Pact stresses the need for accelerated efforts to achieve the **Sustainable Development Goals (SDGs)**, which include eradicating poverty, promoting health, and ensuring access to education.
  - **Reforms to International Financial Systems**: To support these goals, the Pact calls for **reforms to international financial systems**, which would include fairer lending terms and increased funding for climate resilience programs in developing nations.

Conclusion and Way Forward

- **Renewed Commitment**: The Pact signifies a renewed commitment to **multilateralism** and collective action at a time of increasing global fragmentation.
  - It seeks to address the interconnected challenges of the modern world, such as climate change, economic inequality, and geopolitical tensions, through a unified global approach.
- **Long-Term Vision**: By addressing not only immediate needs but also the

needs of future generations, the Pact outlines a holistic vision for a sustainable and equitable world.

○ This requires countries to work together, pooling resources and expertise, to overcome common challenges.

● **Multilateralism's Relevance**: The Pact attempts to bring **multilateralism** back to the forefront of global governance, emphasizing that no single nation can tackle today's complex problems alone.

○ Through cooperation, the international community can build a future that is more just, equitable, and sustainable for all.

HEALTH RISKS DUE TO PESTICIDES AND FERTILISERS

Context:

Recently, due to health concerns over the excessive use of pesticides and fertilisers, farmers in Punjab have started growing organic crops for their own consumption.

About

● **Punjab's Fertiliser Consumption: Leading the Nation: Punjab** is at the forefront of fertiliser use in India, consuming the highest per-unit amount of chemical fertilisers such as **nitrogen**, **phosphate**, and **potash**.

○ Data presented by the **Union Ministry of Chemicals and Fertilisers** in **Rajya Sabha** on **August 6, 2024**, reveals that the state used **103.1 kg of fertiliser per acre** during **2023-24**, significantly higher than

the national average of **58.25 kg per acre**.

○ On a hectare basis, Punjab's consumption stands at **247.61 kg per hectare**, compared to the Indian average of **139.81 kg per hectare**.

● **NPK Fertiliser Surge Over Decades:** Punjab has seen an exponential increase in the use of **nitrogen-phosphorus-potassium (NPK)** fertilisers.

○ Between **1980** and **2018**, fertiliser usage skyrocketed by **180%**, climbing from **0.69 million tonnes** to **1.92 million tonnes**, as per figures from the **Punjab government**.

● **Disproportionate Fertiliser Consumption:** Although Punjab accounts for only **1.53%** of India's total land area, the state is responsible for **9%** of the country's overall fertiliser consumption.

○ This highlights the disproportionate reliance on fertilisers compared to the rest of India, showcasing Punjab's intensive agricultural system.

● **Rising Cancer Cases Linked to Fertiliser and Pesticide Overuse:** The excessive use of fertilisers and pesticides in Punjab has raised serious health concerns, with a notable increase in cancer cases.

○ According to the **Indian Council of Medical Research-National Cancer Registry Programme** (ICMR-NCRP), data shared by the **Union Ministry of Health and Family Welfare** on

February 6, 2024, indicates that cancer cases in the state have risen from **39,521** in **2021** to **42,288** in **2024**.

○ Punjab has long been **referred to as a 'cancer belt'** with many attributing the high incidence of cancer to the overuse of chemical fertilisers and pesticides, which contaminate soil, water, and food supplies.

● **Farmers' Reluctance to Shift to Organic Farming:** Despite the evident risks associated with chemical fertilisers, many farmers in Punjab are reluctant to adopt **organic farming** due to the perceived risk of **lower yields**.

○ Over decades, extensive fertiliser use has led to **soil degradation**, which in turn has caused declining crop productivity and more frequent **pest attacks**.

○ Farmers argue that these factors make it difficult to reduce their dependence on chemical inputs without facing significant losses in output.

● **Long-Term Environmental Impacts:** The overuse of fertilisers not only threatens human health but also has long-term detrimental effects on the environment.

○ **Nitrate runoff** from agricultural fields contaminates water sources, contributing to **water pollution** and harming aquatic ecosystems.

Way Forward

● **Promotion of Balanced Fertilisation**: Encourage the use of organic and bio-

fertilizers alongside chemical ones to restore soil health.

○ Policies should focus on promoting Integrated Nutrient Management (INM), which combines organic, inorganic, and biological inputs.

● **Soil Health Management**: Expand the Soil Health Card scheme to regularly monitor soil health and guide farmers on the appropriate use of fertilisers based on their land's nutrient requirements.

● **Awareness and Education**: Conduct large-scale farmer awareness programs that emphasise the negative effects of excessive fertiliser use and train them in efficient fertiliser practices such as precision farming and drip irrigation.

● **Subsidy Reforms**: Review and reform the fertiliser subsidy policy to incentivize the use of organic fertilisers and reduce the dependence on chemical fertilisers.

○ The government should also promote the use of nano fertilisers and other sustainable alternatives.

● **Support for Sustainable Agriculture**: Expand support for organic farming, agroecological practices, and low-input farming systems through financial incentives, infrastructure development, and market access.

● **Encouraging R&D**: Invest in research and development for sustainable alternatives to chemical fertilisers, including nano-fertilisers, bio-fertilisers, and nutrient-efficient crops.

● **Better Regulation**: Strengthen the regulation of fertiliser distribution and

quality control to prevent overuse and misuse of chemical fertilisers.

  ○ Government agencies can monitor compliance and ensure the responsible use of agricultural inputs.

● **Climate-Smart Practices**: Promote climate-resilient and regenerative agricultural practices that enhance soil fertility without reliance on chemical inputs. This includes crop diversification and the use of nitrogen-fixing crops.
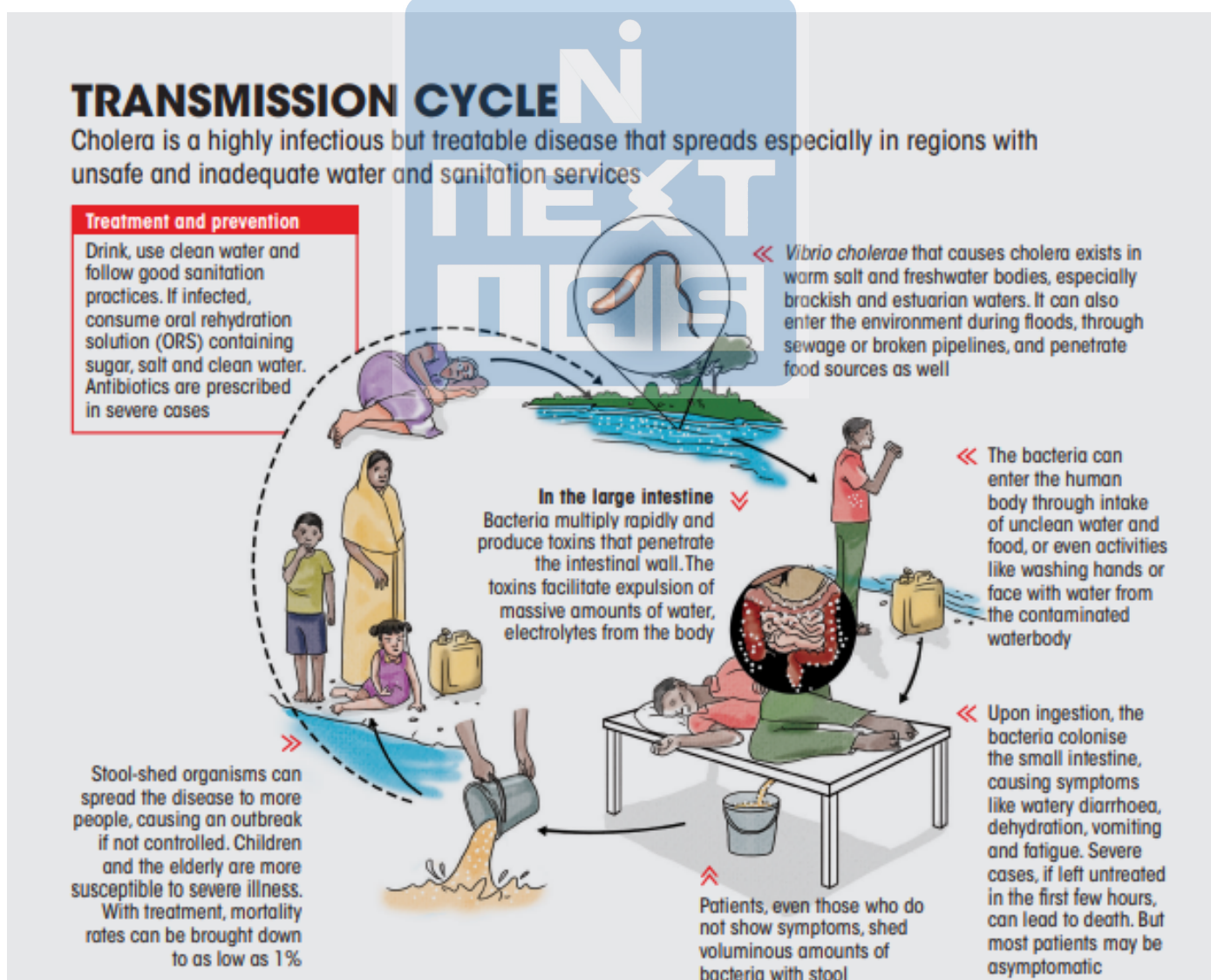
TACKLING CHOLERA: STRATEGIES TO COMBAT RISING INFECTIONS

Context:

Cholera, a waterborne disease caused by the bacterium *Vibrio cholerae*, continues to pose a significant public health challenge in India, particularly in regions with inadequate access to clean water and sanitation.
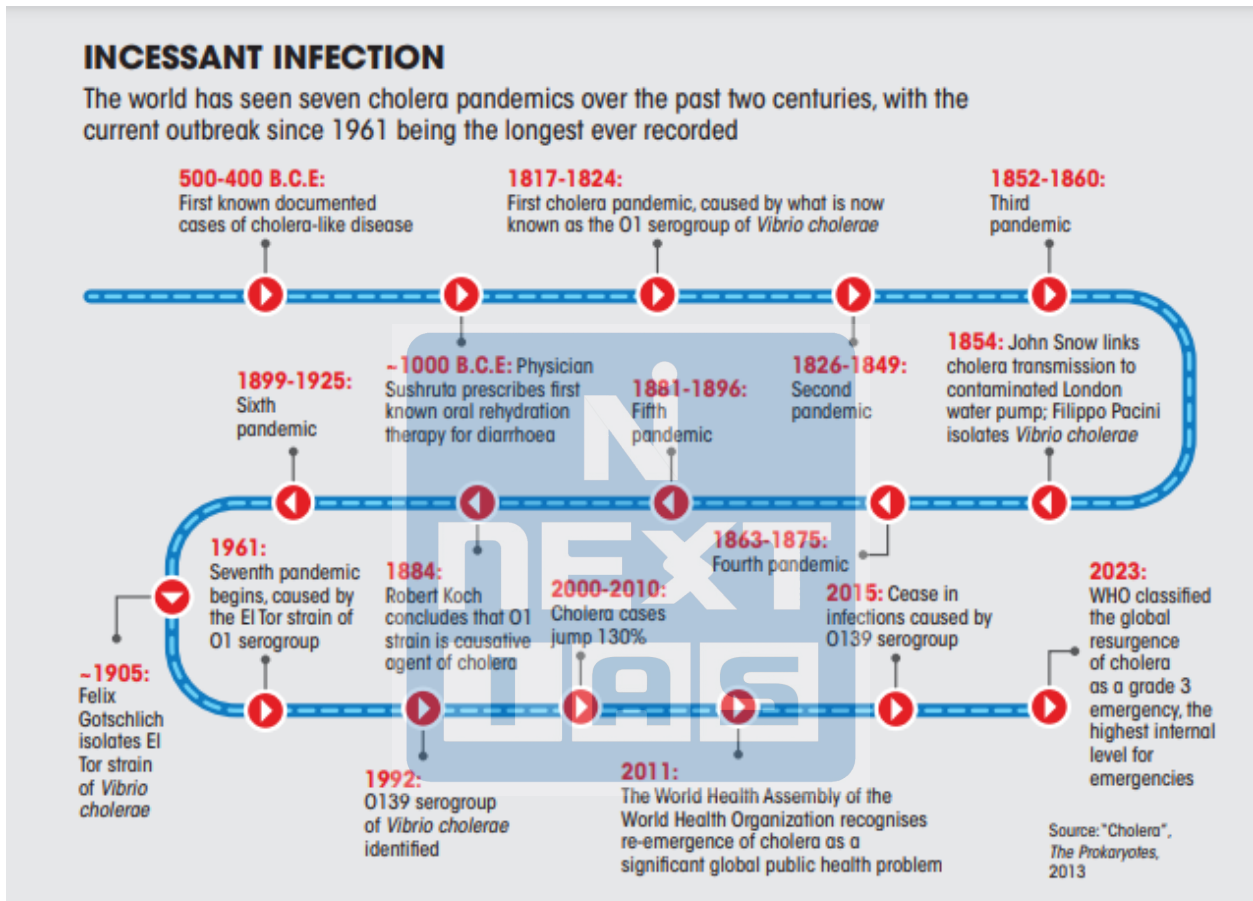
About

● Cholera is caused by the bacterium *Vibrio cholerae*.

● To date, scientists have identified over 200 serogroups of this bacterium, but only two—O1 and O139—are responsible for major epidemics due to their ability to produce cholera toxin.

TRANSMISSION CYCLE

Cholera is a highly infectious but treatable disease that spreads especially in regions with unsafe and inadequate water and sanitation services

Treatment and prevention

Drink, use clean water and follow good sanitation practices. If infected, consume oral rehydration solution (ORS) containing sugar, salt and clean water. Antibiotics are prescribed in severe cases

Vibrio cholerae that causes cholera exists in warm salt and freshwater bodies, especially brackish and estuarian waters. It can also enter the environment during floods, through sewage or broken pipelines, and penetrate food sources as well

In the large intestine
Bacteria multiply rapidly and produce toxins that penetrate the intestinal wall. The toxins facilitate expulsion of massive amounts of water, electrolytes from the body

The bacteria can enter the human body through intake of unclean water and food, or even activities like washing hands or face with water from the contaminated waterbody

Upon ingestion, the bacteria colonise the small intestine, causing symptoms like watery diarrhoea, dehydration, vomiting and fatigue. Severe cases, if left untreated in the first few hours, can lead to death. But most patients may be asymptomatic

Stool-shed organisms can spread the disease to more people, causing an outbreak if not controlled. Children and the elderly are more susceptible to severe illness. With treatment, mortality rates can be brought down to as low as 1%

Patients, even those who do not show symptoms, shed voluminous amounts of bacteria with stool

Pandemic Status

- We are currently facing the seventh cholera pandemic, which has been ongoing since 1961.

- It holds the dubious distinction of being the *"longest-enduring pandemic disease outbreak"* as per the Guinness World Records.

- Although the World Health Organization (WHO) observed a decline in cases in the 1990s, there has been a sharp increase since 2017.

- In 2023, cholera deaths **increased by 71%** globally, and cases **rose by 13%** compared to the previous year.

INCESSANT INFECTION

The world has seen seven cholera pandemics over the past two centuries, with the current outbreak since 1961 being the longest ever recorded

500-400 B.C.E: First known documented cases of cholera-like disease

1817-1824: First cholera pandemic, caused by what is now known as the O1 serogroup of *Vibrio cholerae*

1852-1860: Third pandemic

1899-1925: Sixth pandemic

~1000 B.C.E: Physician Sushruta prescribes first known oral rehydration therapy for diarrhoea

1881-1896: Fifth pandemic

1826-1849: Second pandemic

1854: John Snow links cholera transmission to contaminated London water pump; Filippo Pacini isolates *Vibrio cholerae*

1961: Seventh pandemic begins, caused by the El Tor strain of O1 serogroup

1884: Robert Koch concludes that O1 strain is causative agent of cholera

2000-2010: Cholera cases jump 130%

1863-1875: Fourth pandemic

2015: Cease in infections caused by O139 serogroup

2023: WHO classified the global resurgence of cholera as a grade 3 emergency, the highest internal level for emergencies

~1905: Felix Gotschlich isolates El Tor strain of *Vibrio cholerae*

1992: O139 serogroup of *Vibrio cholerae* identified

2011: The World Health Assembly of the World Health Organization recognises re-emergence of cholera as a significant global public health problem

Source:"Cholera", *The Prokaryotes*, 2013

Climate Change Impact

- Climate change has further intensified the global cholera crisis.

- A 2020 study found that a rise in temperatures resulted in increased bacteria levels, contributing to cholera outbreaks in *India's Punjab, Haryana, and Chandigarh.*

Transmission

- Cholera spreads through the consumption of contaminated water or food, particularly in areas where sanitation is inadequate.

- The disease thrives in conditions of poor hygiene, overcrowding, and lack of access to clean drinking water, which are common in many parts of rural India.

Concerns

- **Lack of Access to Clean Water**: Contaminated water remains one of the primary sources of cholera outbreaks in India.

○ Access to clean drinking water is still limited in many rural and urban areas, which increases the risk of transmission.

● **Inadequate Sanitation**: Despite government initiatives, many areas in India still lack proper sanitation facilities.

○ Open defecation and untreated sewage contaminate water sources, contributing to cholera outbreaks.

● **Underreporting**: Cholera is often a neglected and underreported disease in India. Although it is a notifiable disease, meaning that states are required to report outbreaks to the Integrated Disease Surveillance Programme (IDSP), the actual data is frequently incomplete.

○ Underreporting complicates the public health response and resource allocation.

● **Healthcare Infrastructure**: Many regions, particularly rural areas, have insufficient healthcare infrastructure to provide timely treatment.

○ The lack of adequate rehydration therapies and medical supplies can lead to higher mortality rates, especially during large-scale outbreaks.

● **Climate Change**: The increasing frequency of extreme weather events—floods, droughts, and heavy rainfall—due to climate change is creating conditions that favour cholera outbreaks.

○ Flooding often contaminates drinking water supplies, while droughts can lead to the use of unsafe water sources.

Measures Needed to Address Cholera

● **Improved Water and Sanitation Infrastructure**: Long-term investments in clean drinking water systems and sewage treatment facilities are critical to preventing cholera.

○ This includes expanding rainwater harvesting systems and ensuring safe water access in both urban and rural areas.

○ Efforts like the **Swachh Bharat Abhiyan** need to be sustained and extended to ensure comprehensive coverage of sanitation facilities across the country.

● **Strengthening Disease Surveillance**: A robust surveillance system is needed to detect cholera outbreaks early. The government must enhance real-time reporting, particularly in vulnerable areas, to enable a quick and effective response.

○ Regular monitoring of water quality in cholera-prone regions can prevent outbreaks before they occur.

● **Public Awareness Campaigns**: Awareness programs should educate the public on hygiene practices, proper sanitation, and the importance of safe water use.

○ Emphasising simple actions like boiling water and washing hands can significantly reduce the risk of transmission.

- **Access to Treatment**: Timely access to Oral Rehydration Solution (ORS) and intravenous fluids can save lives.

  - Ensuring healthcare facilities, especially in rural areas, are equipped to provide these treatments is vital.

  - Mobile health units should be deployed during outbreaks to reach remote areas quickly.

- **Vaccination**: Cholera vaccines should be made widely available in high-risk regions. While vaccination is not a complete solution, it can help control the spread of the disease, especially during outbreaks.

- **Climate-Resilient Strategies**:

  - India must develop water and sanitation infrastructure that can withstand the challenges posed by climate change.

  - Flood-prone areas should receive special attention, with disaster-preparedness measures tailored to cholera prevention.

Way Forward

- **Focus on Water, Sanitation, and Hygiene (WASH)**: Expanding WASH initiatives, particularly in areas prone to cholera outbreaks, is key to long-term prevention.

- **Strengthening Healthcare Systems**: Rural health centres should be better equipped to handle cholera cases. This includes ensuring sufficient supplies of ORS, antibiotics, and rehydration therapy.

- **Climate Change Mitigation**: Addressing the environmental factors contributing to cholera outbreaks is crucial. Governments and local authorities must work towards climate-resilient water management systems to reduce the impact of extreme weather events on water safety.

- **Global Cooperation**: International partnerships, especially with global organisations like WHO, can help India adopt best practices in cholera control.

  - Sharing data and resources globally can also enhance the country's ability to respond to outbreaks quickly and effectively.

- **Innovation and Technology**: Investment in new technologies for water purification and sanitation can provide communities with more sustainable solutions.

  - Developing low-cost, easy-to-deploy purification systems for use in rural areas can help prevent cholera outbreaks.

IMPACT OF MICROPLASTICS ON ENVIRONMENT AND HEALTH

Context:

Recently, Microplastics, tiny plastic particles less than 5 millimetres in size, have become a significant environmental and health concern worldwide.
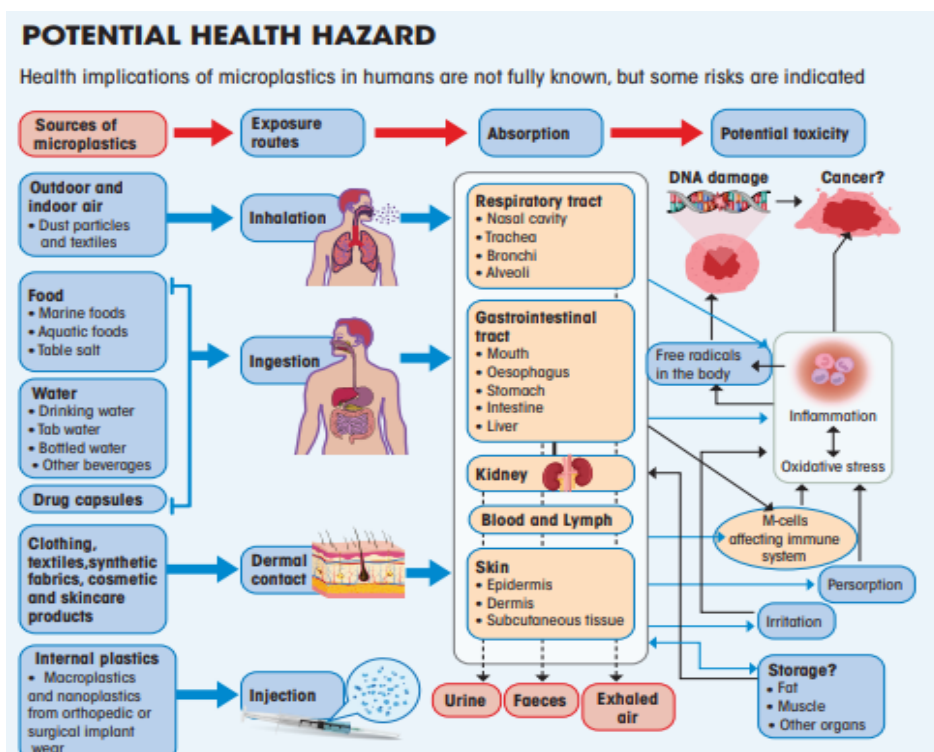
About the Microplastics

- Microplastics are plastic particles measuring less than 5 millimetres in diameter.

- They can be classified into primary microplastics, which are manufactured at that size for specific uses (e.g., microbeads in cosmetics), and secondary microplastics, which result from the degradation of larger plastic items discarded into the environment.

- Microplastics are generated primarily from two sources:

  ○ **Degradation of Larger Plastics**: As plastic waste—such as bottles, bags, and containers—breaks down due to environmental factors like sunlight and weathering, it fragments into smaller particles.

  ○ **Intentional Production**: Certain products, like exfoliating scrubs and toothpaste, contain microbeads that are intentionally added for their abrasive properties.

- **Global Plastic Production**:

  ○ The world produces approximately 430 million tonnes of plastic each year.

  ○ Alarmingly, two-thirds of this plastic is used for short-lived purposes, leading to vast quantities of waste that can degrade into microplastics.

- **UNEP Labelling**: The United Nations Environment Programme (UNEP) has labelled microplastics as an emerging contaminant, indicating their pervasive presence in the environment and potential threats to human health and ecological systems.

Impact of Microplastics

- **Health Concerns**: **Bioaccumulation in Human Organs**; **Potential Health Risks** including **Oxidative Stress and Inflammation**, **DNA Damage**, and **Impact on Specific Populations**: Children, who may ingest higher quantities of microplastics relative to their body weight, are particularly vulnerable to the potential health risks associated with these particles.

POTENTIAL HEALTH HAZARD
Health implications of microplastics in humans are not fully known, but some risks are indicated

- **Environmental Damage** like **Soil Contamination, Marine Ecosystems**. **Ecosystem Imbalance**,

Way Forward

- **Collaborative Action**: Governments, industries, NGOs, and communities must work together to implement comprehensive measures against microplastic pollution.
  - Collaboration can facilitate knowledge sharing, resource allocation, and innovative solutions to combat plastic waste.
- **Investment in Research and Innovation**: Increased investment in research and development is necessary to explore alternatives to plastic materials, biodegradable options, and new waste management technologies.
  - Innovation can pave the way for a circular economy that minimises plastic waste.
- **Commitment to Sustainable Practices**: Industries should prioritise sustainable materials and practices in production processes.
  - This can include using biodegradable materials, implementing recycling initiatives, and promoting responsible consumption.
- **Global Accountability**: As countries negotiate the Global Plastics Treaty, it is vital to establish clear obligations for tracking and reducing microplastics.
  - Regular assessments and accountability measures will ensure compliance and facilitate the evaluation of progress in mitigating microplastic pollution.

ROLE OF GIS IN URBAN WASTE MANAGEMENT

- Urban waste management is a critical challenge faced by cities worldwide. With the rapid pace of urbanisation, efficient and sustainable waste management systems are essential to maintain public health and environmental quality.
- Geographic Information Systems (GIS) have emerged as a powerful tool in addressing these challenges by providing spatial analysis and data management capabilities.

Understanding GIS

- GIS are designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data.
- GIS technology integrates various data types, including satellite imagery, aerial photography, and ground-based data, to create comprehensive maps and models. These tools are invaluable in urban planning, environmental monitoring, and resource management.

GIS in Waste Collection and Route Optimisation

- One of the primary applications of GIS in urban waste management is optimising waste collection routes.
- Efficient route planning can significantly reduce fuel consumption, labour costs, and greenhouse gas emissions. GIS allows municipalities to analyse spatial data on waste generation patterns,

traffic conditions, and road networks to design optimal collection routes.

- It not only improves operational efficiency but also enhances service delivery to residents.

Site Selection for Waste Disposal

- Selecting suitable sites for waste disposal is a complex task that involves multiple criteria, including environmental impact, proximity to urban areas, and geological conditions.

- GIS facilitates this process by integrating various data layers, such as land use, soil type, hydrology, and population density.

- For instance, ISRO has utilised high-resolution satellite imagery from its **Cartosat-1 and Resourcesat-1 satellites** to identify potential landfill sites and avoid environmentally sensitive areas.

Monitoring and Managing Landfills

- GIS technology is also crucial in monitoring and managing existing landfill sites. By analysing spatial data, authorities can assess landfill stability, monitor leachate movement, and detect illegal dumping activities.

- It helps in ensuring compliance with environmental regulations and mitigating potential health risks. Additionally, GIS-based models can predict the lifespan of landfills and plan for future waste management needs.

Resource Allocation

- By providing accurate data, GIS can aid in better resource allocation for waste management, ensuring that manpower

and funds are directed where they are needed most.

- This strategic approach can improve operational efficiency and effectiveness in waste management.

Real-time Data

- Drones can provide real-time updates on waste volumes and environmental conditions, enabling faster responses to emerging issues.

- This capability can be especially beneficial during emergencies, such as fires or hazardous material spills at dumpsites.

Case Study: ISRO's Contributions

- The Indian Space Research Organisation (ISRO) has been at the forefront of leveraging GIS for urban waste management. **ISRO's Regional Remote Sensing Service Centre (RRSSC)** has developed a customised GIS package called **'Parikrama'** for efficient solid waste management.

- It helps in site selection for waste disposal, route optimization, and resource allocation. For example, the Ranchi Municipality in Jharkhand has successfully implemented ISRO's GIS solutions to manage waste in its 37 wards.

Future Applications

- **GIS and Remote Sensing Integration**: By employing machine learning algorithms alongside GIS, cities can predict waste generation trends based on historical data and socio-economic factors.

  ○ This predictive modelling can help authorities prepare for future

challenges and implement proactive waste management strategies.

● **Urban Planning and Waste Management**: The integration of GIS into urban planning frameworks can enhance collaboration among various government agencies, non-profits, and community groups for coordinated waste management efforts.

  ○ This multi-stakeholder approach can lead to more sustainable urban development practices.

● **Public Engagement**: Engaging the public through interactive GIS maps can foster greater community involvement in waste management initiatives, encouraging recycling and waste reduction practices.

  ○ By visualising waste data, citizens can better understand the impact of their behaviours and contribute to local solutions.

Prelims

GILEAD'S HIV DRUG

Context:

Recently, patient advocacy groups have voiced their opposition to the patents on **Lenacapavir,** a potential breakthrough treatment in the fight against the HIV-AIDS epidemic.

Current HIV Statistics

● **Global HIV Impact**: HIV has claimed approximately 42.3 million lives since the epidemic began.

  ○ At the end of 2023, around 39.9 million people were living with HIV,

predominantly in the WHO African Region.

● **New Infections and Deaths**: Last year, an estimated 1.3 million people were newly infected with HIV, with 630,000 deaths attributed to HIV-related causes, including 76,000 children.

● **2030 Goals**: To meet the target of ending the HIV epidemic by 2030 under the UN Sustainable Development Goals (SDGs), there is an urgent need for effective HIV prevention strategies.

RECORD TEMPERATURES IN AUGUST 2024

Context:

Recently, August 2024 marked the hottest month globally in 175 years, emphasising the urgent need to address the escalating impacts of climate change.

Global Temperature Data

● According to the US National Oceanic and Atmospheric Administration (NOAA), August 2024 was recorded as the hottest month globally in 175 years.

● The average global land and ocean surface temperature reached a concerning 1.27ºC above the 20th-century average, continuing a streak of record-breaking temperatures that has persisted for 14 months.

● This alarming trend underscores the accelerating impacts of climate change, which have significant implications for ecosystems, agriculture, and human health, highlighting the urgent need for immediate action.

Reasons for rise in atmospheric temperature

- **Greenhouse Gas Emissions**: The burning of fossil fuels (coal, oil, and natural gas) for energy and transportation releases significant amounts of carbon dioxide (CO_2) and methane (CH_4), both potent greenhouse gases that trap heat in the atmosphere.

- **Deforestation**: Trees absorb CO_2; therefore, deforestation reduces the number of trees available to absorb carbon, increasing the concentration of CO_2 in the atmosphere.

- **Industrial Activities**: Many industrial processes emit greenhouse gases and other pollutants that contribute to global warming, including refrigerants and aerosols.

- **Agricultural Practices**: Agriculture contributes to greenhouse gas emissions through livestock digestion (methane emissions), the use of synthetic fertilisers (which release nitrous oxide), and land-use changes.

- **Waste Management**: Landfills produce methane during the decomposition of organic waste, contributing to greenhouse gas emissions.

FUKUSHIMA NUCLEAR PLANT: OPERATION SUSPENDED

Context:

On September 17, Japan suspended operations to remove radioactive material from the decommissioned Fukushima nuclear power plant, highlighting ongoing challenges in managing the aftermath of the 2011 disaster.

Background on Fukushima

- Japan suspended its operation to remove highly radioactive material from the decommissioned Fukushima nuclear power plant on September 17.

- This effort is part of a broader initiative to manage the legacy of the nuclear disaster that occurred in 2011, following a devastating tsunami that severely damaged the plant and led to the release of radioactive materials into the environment.

- The disaster not only had immediate consequences but also created long-term challenges in ensuring the safety of the surrounding areas.

Long-term Implications

- The inability to progress with the removal operation raises significant concerns about the long-term safety of the site and surrounding communities.

- Continuous monitoring and effective management strategies are essential to mitigate risks associated with remaining radioactive materials.

- The situation underscores the importance of robust nuclear safety regulations and disaster preparedness in preventing future incidents.

- It also calls for increased public transparency and community engagement to address the fears and uncertainties faced by residents living near the site, ensuring that their safety and well-being are prioritised in the ongoing decommissioning efforts.

ECUADOR FACES NATIONWIDE BLACKOUTS

Context:

On September 19, Ecuador implemented nationwide nighttime blackouts due to a severe drought impacting its hydropower plants, emphasising the urgency of addressing energy security and resource management.

Power Crisis Due to Drought

- Ecuador initiated nationwide nighttime blackouts starting September 19, driven by a severe drought that is significantly affecting the country's hydropower plants—its primary source of electricity.

- These power cuts, scheduled for four nights a week, aim to conserve water levels in reservoirs critical for energy generation.

- The decision underscores the vulnerability of relying heavily on hydropower in the face of climate change, which can lead to unpredictable weather patterns and prolonged dry spells.

INDIA: WORLD'S BIGGEST PLASTIC POLLUTER

Context:

Recently, A study published on September 4 by the University of Leeds highlights India's position as the world's largest plastic polluter, contributing approximately 9.3 million tonnes of plastic waste annually, underscoring the urgent need for action.

Plastic Pollution Statistics

- A September 4 study published in **Nature** by the **University of Leeds** revealed that **India is the world's largest plastic polluter**, contributing approximately **9.3 million tonnes of plastic waste annually**.

- This staggering figure emphasises the urgent need for comprehensive **waste management policies** and practices to address **plastic pollution** effectively.

- The scale of this issue not only poses severe environmental challenges but also affects public health and wildlife, stressing the importance of immediate and sustained efforts to mitigate the crisis.

Underestimated Waste Generation

- The study suggests that India's official **waste generation rate**, estimated at **0.12 kg per capita per day**, is likely **underestimated**.

- Accurate data on waste generation is critical for developing effective **waste management strategies**, as miscalculations can lead to inadequate infrastructure and policy responses.

- An underestimation of waste generation not only hampers government initiatives but also affects the ability of local authorities to allocate resources efficiently, thereby complicating efforts to combat plastic pollution on the ground.

Collection Discrepancies

- The study also indicates that **waste collection figures** are **overestimated**, which can result in misleading perceptions of the effectiveness of existing **waste management systems**.

- This discrepancy can hinder efforts to implement improvements, as stakeholders may believe that the current system is functioning adequately when, in reality, significant gaps exist.

- Addressing these discrepancies is essential for improving **waste collection efficiency** and promoting **recycling** and **reduction initiatives**.

- It is imperative to develop a robust monitoring framework that provides accurate assessments of waste collection rates and practices.

Subjective Questions

1. Discuss the key achievements and challenges in the performance of the Pradhan Mantri Jan Arogya Yojana (PMJAY) in enhancing health insurance accessibility and affordability for underserved populations in India.

2. Examine the factors contributing to human-wildlife conflict in India and suggest effective strategies to mitigate these conflicts while ensuring wildlife conservation and community welfare.

3. Discuss the health risks associated with the use of pesticides and fertilisers in agriculture. Suggest measures to promote safer alternatives and enhance the health of farming communities.

4. Analyse the rising incidence of cholera infections globally. Discuss effective strategies for prevention and control, including public health initiatives and community engagement, to mitigate this public health threat.

5. Examine the environmental and health impacts of microplastics. Discuss comprehensive strategies for reducing microplastic pollution.

MCQs

Q.1 Which of the following statements regarding the Minimum Support Price (MSP) in India is/are correct?

1. MSP is announced for 23 crops by the Government of India.

2. MSP is intended to provide a safety net for farmers against fluctuations in market prices.

3. MSP is applicable only to food grains and does not cover commercial crops like cotton and sugarcane.

4. The MSP is determined by the Commission for Agricultural Costs and Prices (CACP).

Select the correct answer using the options given below:

(a)   1 and 2 only

(b)   2 and 4 only

(c)   1, 2, and 4 only

(d)   1, 2, 3, and 4

Q.2 Which of the following countries share a border with Ecuador?

1. Peru
2. Colombia
3. Brazil
4. Chile

Select the correct answer using the options given below:

(a)   1 and 2 only

(b)   1, 2, and 3 only

(c)   1, 2, and 4 only

(d)   1, 2, 3, and 4

Q.3 Which of the following statements regarding microplastics is/are correct?

1. Microplastics are defined as plastic particles smaller than 5 millimeters in size.
2. They are primarily generated from the breakdown of larger plastic items and are not found in the food chain.
3. Microplastics can have harmful effects on marine life and human health.

Select the correct answer using the codes given below:

(a)   1 only

(b)   1 and 3 only

(c)   2 and 3 only

(d)   1, 2, and 3

Q.4 Which of the following statements regarding cholera is/are correct?

1. Cholera is caused by the bacterium *Vibrio cholerae* and is primarily spread through contaminated water.

2. Cholera can be effectively treated with antibiotics alone.

3. Vaccination is available to prevent cholera, but it is not widely used in endemic regions.

Select the correct answer using the codes given below:

(a)   1 only

(b)   1 and 2 only

(c)   1 and 3 only

(d)   1, 2, and 3

Q.5 Which of the following statements regarding India's status as a plastic polluter is/are correct?

1. India contributes approximately 9.3 million tonnes of plastic waste annually, making it the world's largest plastic polluter.

2. The majority of plastic waste generated in India is recycled, with high efficiency in waste collection and management.

3. The rapid increase in plastic pollution in India is attributed to factors such as increased production of plastics, single-use plastics, and inadequate waste management infrastructure.

Select the correct answer using the codes given below:

(a)   1 only

(b)   1 and 2 only

(c)   1 and 3 only

(d)   1, 2, and 3

Answer keys: 1. (c) 2. (a) 3. (b) 4. (c) 5. (c)