

UPSC CURRENT AFFAIRS NOTES 10-01-2024

‘Starliner’

Chief of Naval Staff recently flagged off the first indigenously manufactured Drishti 10 'Starliner' Unmanned Aerial Vehicle (UAV) for the Navy.



About Drishti 10 ‘Starliner’

- It is an indigenously manufactured Unmanned Aerial Vehicle (UAV).
- It was developed by Adani Defence and Aerospace.
- It is an advanced intelligence, surveillance, and reconnaissance (ISR) platform with 36 hours endurance and a 450 kg payload capacity.
- It is an all-weather military platform which has clearance to fly in both segregated and unsegregated airspace.
- It is designed to possess high endurance, combat-proven capabilities, and advanced features, providing a significant boost to India’s naval capabilities.
- The UAV’s autonomous nature, coupled with its mission effectiveness and payload configuration options, makes it an invaluable asset for strategic operations.



- One of the distinguishing features of the Drishti 10 ‘Starliner’ is its minimal maintenance requirements, making it cost-effective and operationally efficient.
- This characteristic ensures increased operational readiness, reducing downtime, and maximizing deployment opportunities.
- It is equipped with advanced communication systems, including satellite communication and Line-of-Sight (LOS) data links, ensuring reliable and secure data transmission.

INS Kabra

Indian warship, INS Kabra, an indigenous fast attack craft, docked at the Colombo port in a move aimed at fostering bilateral ties between India and Sri Lanka.

About INS Kabra

- It is a naval vessel named after an island of the Andaman and Nicobar archipelago.
- It belongs to the Car Nicobar class of high-speed offshore patrol vessels are built by Garden Reach Shipbuilders and Engineers (GRSE) for the Indian Navy.
- It was the eighth in a series of 10 Fast Attack Crafts.
- The vessels are designed as a cost-effective platform for patrol, anti-piracy and rescue operations in India's Exclusive Economic Zone.
- The class and its vessels are named for Indian islands. They are the first water jet propelled vessels of the Indian Navy.
- With a top speed of over 35 knots, and excellent manoeuvrability offered by her water-jet propulsion, the ship is ideally suited for high-speed interdiction of fast moving targets.
- It is with the latest regulations of the International Maritime Organisation on sea compliance pollution control.

Rise in Flooding in European Countries



Heavy rains have hit France, England, Netherlands and Germany for more than two weeks, causing rivers to burst their banks in many areas, flooding homes and prompting evacuations.

Reasons behind the Rise in Flooding in European Countries

Climate Change-Induced Extreme Weather:

- Changes in global climate patterns have led to more frequent and intense rainfall events, increasing the risk of flooding.
- Example: The devastating floods in Germany and Belgium in July 2021 were linked to unprecedented levels of rainfall, with some areas receiving several months' worth of rain in just a few days.

Urbanization and Altered Land Use:

- Rapid urbanization and changes in land use contribute to increased surface runoff, reducing natural water absorption.
- Example: The expansion of urban areas in the Paris metropolitan region has led to increased impervious surfaces, exacerbating flooding during heavy rainfall events.

River and Coastal Flooding:

- Changes in precipitation patterns and rising sea levels intensify river and coastal flooding.
- Example: The Netherlands, with a significant portion of its land below sea level, faces increased risks of river and coastal flooding due to sea-level rise and extreme weather events.

Inadequate Infrastructure and Aging Drainage Systems:

- Aging infrastructure and inadequate drainage systems contribute to the vulnerability of regions to flooding.
- Example: Venice, Italy, experiences recurrent flooding, aggravated by the outdated design of the city's drainage and pumping systems.

Deforestation and Land Degradation:

- Deforestation and land degradation reduce the natural capacity of ecosystems to absorb and regulate water flow.
- Example: The extensive deforestation in parts of central and eastern Europe has increased the risk of flash floods and soil erosion.

Increased River Channelization:

- Alterations to river channels and excessive channelization reduce natural floodplains, exacerbating flood risks.
- Example: The channelization of the Loire River in France has altered its natural course, contributing to increased flood risks downstream.

Poor Water Management Practices:

- Inefficient water management practices, including inadequate reservoir management, can lead to uncontrolled water releases during heavy rainfall.
- Example: The mismanagement of reservoirs in the Elbe River basin in Germany during the 2013 floods worsened downstream flooding in affected regions.

Melting Glaciers and Snowmelt:

- The melting of glaciers and increased snowmelt contribute to elevated river levels and increased flood risks.
- Example: The Alps, a major source of rivers in Europe, have experienced accelerated glacier melt, influencing river discharge patterns and contributing to flooding events.

Changes in Atmospheric Circulation:

- Alterations in atmospheric circulation patterns can result in prolonged periods of heavy rainfall and increased flooding.
- Example: Changes in the North Atlantic Oscillation (NAO) have been linked to shifts in weather patterns, influencing precipitation levels and contributing to flooding events in Europe.

Land Use Planning and Zoning Issues:

- Poor land use planning and zoning regulations can lead to construction in flood-prone areas, increasing vulnerability.



- Example: The 2014 flooding in the Balkans was exacerbated by inadequate land use planning, allowing construction in flood-prone regions.
- Addressing the rise in flooding requires a holistic approach, encompassing climate resilience, sustainable land use practices, improved infrastructure, and effective water management strategies.

Implications

The rise in flooding in European countries carries significant implications across various sectors, impacting communities, economies, and the environment. Here are the key implications:

Human Lives and Safety:

- Implication: Increased flooding poses a direct threat to human lives, leading to casualties and injuries during extreme weather events.
- Example: The 2002 flooding in Central Europe resulted in numerous fatalities, emphasizing the immediate danger flooding poses to residents.

Property and Infrastructure Damage:

- Implication: Flooding causes extensive damage to homes, businesses, and critical infrastructure, leading to substantial economic losses.
- Example: The 2013 floods in Germany resulted in billions of euros in damages, affecting residential areas, transportation networks, and industrial facilities.

Economic Disruption:

- Implication: Flood-related damages disrupt economic activities, affecting industries, agriculture, and trade.
- Example: The disruption of transportation and production during the 2019 Venice floods impacted the local economy, particularly the tourism sector.

Displacement and Migration:

- Implication: Communities living in flood-prone areas may face displacement, leading to internal or cross-border migration.
- Example: Flood-induced displacement in low-lying regions of the Netherlands may necessitate migration to safer areas.



Environmental Impact:

- Implication: Flooding has environmental consequences, including soil erosion, loss of biodiversity, and contamination of water bodies.
- Example: The flooding of the Elbe River in 2002 resulted in soil erosion and the spread of pollutants, impacting ecosystems and aquatic life.

Infrastructure Strain:

- Implication: Frequent flooding strains existing infrastructure, including drainage systems, levees, and flood defenses.
- Example: The strain on the Thames Barrier in London during increased flooding events underscores the need for continuous maintenance and upgrades.

Health Risks:

- Implication: Flooding can lead to health risks, including waterborne diseases, as contaminated water may pose a threat to public health.
- Example: Post-flood outbreaks of waterborne diseases, such as gastroenteritis, highlight the health risks associated with contaminated floodwaters.

Insurance Costs and Financial Burden:

- Implication: Increased flooding leads to higher insurance claims and financial burdens on individuals, businesses, and governments.
- Example: Rising insurance premiums in flood-prone areas, such as those affected by the Seine River floods in Paris, reflect the increased financial risk.

Impact on Agriculture:

- Implication: Floods damage crops, disrupt agricultural activities, and contribute to food supply chain disruptions.
- Example: The 2010 floods in Pakistan submerged large agricultural areas, leading to substantial losses in crop production and livestock.

Nanoplastic Pollution



Each litre of bottled water contains 110,000 to 370,000 plastic particles — and about 90 per cent of them are nanosized (less than 1 micrometer in size)--- research published in journal Proceedings of the National Academy of Sciences noted.

Findings of the Study

- **Each litre of bottled water contains 110,000 to 370,000 plastic particles** — and about 90 per cent of them are nanosized (less than 1 micrometer in size), a new study has found. These nanoplastics are even smaller than microplastics and pose a greater risk to human health.
- The quantity of these particles in bottled water is 10 to 100 times greater than previous estimates.
- Most plastics divide into smaller and smaller particles of the same chemical composition and there is no theoretical limit to how small they can get.
- Unlike microplastics (ranging between 5 millimeters and 1 micrometer), nanoplastics can move from the intestines and lungs directly into the bloodstream before reaching the heart and brain. This raises concern over the potential health impacts.
- While traditional techniques using pure plastics have confirmed the existence of nanoplastics, much remains unknown about their distribution, abundance, types in our environment and exposure levels.

- Yan and his colleagues analysed micro and nanoplastics in three popular brands of daily consumed bottled water using a technique called stimulated Raman scattering microscopy.
- Stimulated Raman scattering microscopy is a powerful imaging technique that provides highly specific chemical information about a sample.
- The technique passes two lasers through the sample. It is particularly suitable for the identification of microplastics due to its ability to distinguish different types of plastics based on their molecular fingerprints.
- It can be used to study tiny plastic particles from water bodies to biological tissues, thereby aiding in the assessment of environmental pollution and its potential impacts on ecosystems and human health.
- The team looked for seven common plastics: Polyamide, polypropylene, polyethylene, polymethyl methacrylate, polyvinyl chloride, polystyrene, and polyethylene terephthalate. These chemicals are found likely to play a significant role in micro-nano plastics exposure from bottled waters, the paper noted.
- On average, the team detected some 240,000 detectable plastic fragments, 10 per cent of which were identified as microplastics and the remaining were nano-sized.
- All seven of the plastic compounds were detected in the samples. Polyethylene terephthalate, or PET, which is used in disposable beverage bottles, could leach into water when the bottle is squeezed or exposed to heat.
- The study also observed that PET was outnumbered by polyamide, a type of nylon. The researchers suspect that it could have been introduced by plastic filters that work to purify water. Polyamide is the most popular membrane material used in reverse osmosis.
- Polypropene is widely used as equipment components or coagulant aids in water treatment. Polyvinyl chloride is identified as the most abundant polymer type in raw water, while polystyrene is used as backbone material for ion exchange resins (used to demineralise water) in the water purification process.
- These seven plastics accounted for 10 per cent of all the nanoparticles they found in the samples. The remaining are unknown. 90 per cent could

be inorganic nanoparticles and might not be among the seven major types.

Nanoplastic

- Nanoplastics are tiny plastic particles that have dimensions at the nanoscale, typically measuring less than 100 nanometers in size.
- These particles can result from the degradation or fragmentation of larger plastic items or intentional manufacturing at the nanoscale for specific applications.

Sources of Nanoplastics

- There are two primary sources of Nanoplastics:

Microplastic Fragmentation:

- **Mechanical Breakdown:** Larger plastic items, such as bottles, bags, or packaging materials, can break down into smaller pieces due to physical forces like abrasion, wave action, and weathering.
- **Chemical Processes:** Exposure to environmental factors like sunlight (UV radiation) and reactive chemicals can lead to chemical degradation, resulting in the formation of nanoplastic particles.

Intentional Nanoplastics:

- **Industrial Processes:** Some industries intentionally produce nanoplastics at the nanoscale for various applications. These applications include cosmetics, textiles, medical devices, and other consumer products.
- **Usage and Disposal:** Intentionally manufactured nanoplastics can enter the environment during the production, use, and disposal phases of these products.

Nanoplastic Pollution

- Nanoplastic pollution is a subset of the larger issue of plastic pollution, which involves the accumulation of plastic debris in ecosystems, leading to adverse environmental and health impacts.

Marine Nanoplastic Pollution:

- A study published in the journal Nature Nanotechnology (2018) estimated that over 10 trillion nanoplastic particles enter the oceans each day globally, raising concerns about their impact on marine ecosystems.



- Research conducted by the National Center for Ecological Analysis and Synthesis (NCEAS) suggested that nanoplastics, due to their small size, may be more harmful to marine life than larger plastic particles. The study found that nanoplastics can be ingested by a wide range of marine organisms, from zooplankton to larger fish.

Terrestrial Nanoplastic Pollution:

- Studies examining nanoplastic contamination in soil are limited compared to marine environments. However, research published in Environmental Science & Technology Letters (2017) demonstrated that nanoplastics can accumulate in agricultural soils, potentially affecting plant health and crop productivity.

Intentional Nanoplastics:

- The intentional use of nanoplastics in consumer products, such as personal care items and cosmetics, has raised concerns. A report by The Ocean Cleanup organization highlighted the presence of micro- and nanoplastics in personal care products, with millions of particles potentially released daily into wastewater.

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Impact of Nanoplastic Pollution

Marine Ecosystem:

- **Bioaccumulation:** Nanoplastics are ingested by marine organisms, leading to bioaccumulation in the food chain, with potential harm to larger marine species, including fish and marine mammals.
- **Toxicity:** Nanoplastics can carry adsorbed pollutants, leading to enhanced toxicity when ingested by marine life.

Terrestrial Ecosystem:

- **Soil Contamination:** Nanoplastics in soil can alter soil structure and impact plant growth, potentially affecting agricultural productivity.
- **Plant Uptake:** Nanoplastics may be taken up by plants, potentially entering the food chain and affecting human health.

Human Health:

- **Contaminated Food:** Nanoplastics in seafood pose a risk to human health through the consumption of contaminated fish and shellfish.
- **Inflammatory Response:** While the direct health impact is not fully known, exposure to nanoplastics may induce inflammatory responses in living organisms.

Persistence:

- **Long-Term Contamination:** Nanoplastics persist in the environment, leading to prolonged contamination and potential ecosystem disruption.

Ecosystem Resilience:

- **Biodiversity Decline:** Nanoplastics contribute to biodiversity loss as certain species are vulnerable to nanoplastic exposure, impacting ecosystem resilience.

Research Challenges:

- **Detection Difficulty:** The small size of nanoplastics poses challenges in detection and monitoring, hindering a comprehensive understanding of the extent of nanoplastic pollution.

Way Ahead

Addressing nanoplastic pollution requires a combination of proactive measures, regulatory actions, and technological innovations. Here are concrete solutions to tackle the nanoplastic pollution issue:

Regulatory Measures:

- **Ban or Restriction on Intentional Nanoplastics:** Implement regulations that restrict or ban the intentional use of nanoplastics in consumer products, especially in cosmetics, personal care items, and other applications where intentional production is unnecessary.
- **Microplastic-Free Certification:** Establish standards and certifications for products that are free from intentional micro- and nanoplastics, encouraging industries to adopt environmentally friendly alternatives.

Waste Management and Recycling:

- **Enhanced Waste Collection:** Improve waste collection systems to minimize the release of macroplastics into the environment, recognizing



that nanoplastics often originate from the breakdown of larger plastic items.

- **Advanced Recycling Technologies:** Invest in and promote the development of advanced recycling technologies that can effectively capture and process nanoplastics from various waste streams.

Consumer Awareness and Behavior:

- **Educational Campaigns:** Launch public awareness campaigns to educate consumers about the sources and impacts of nanoplastic pollution, encouraging responsible plastic use and disposal.
- **Promotion of Sustainable Alternatives:** Encourage the use of sustainable and eco-friendly alternatives to plastic products, reducing overall plastic consumption.

Research and Monitoring:

- **Funding for Nanoplastic Research:** Allocate research funding to better understand the sources, behavior, and ecological impacts of nanoplastics, including studies on their potential health effects on humans.
- **Development of Detection Methods:** Invest in the development of reliable and standardized methods for detecting and quantifying nanoplastics in various environmental matrices, facilitating more accurate assessments of nanoplastic pollution levels.

International Cooperation:

- **Global Agreements:** Facilitate international cooperation and agreements to address nanoplastic pollution, fostering collaboration between countries to develop and implement effective strategies.
- **Sharing Best Practices:** Establish a platform for sharing best practices and successful initiatives in nanoplastic mitigation among nations, encouraging the adoption of proven methods.

Innovation and Technology:

- **Nanoplastic Filtration Systems:** Develop innovative filtration systems for wastewater treatment plants to capture and remove nanoplastics before they enter aquatic environments.
- **Biodegradable Plastics:** Invest in research and development of biodegradable plastics that break down into harmless components, reducing the persistence of plastic particles in the environment.



Corporate Responsibility:

- **Product Labeling:** Encourage companies to label products containing micro- or nanoplastics, allowing consumers to make informed choices.
- **Extended Producer Responsibility (EPR):** Implement EPR programs, making producers responsible for the entire life cycle of their products, including proper disposal and recycling.

Community Engagement:

- **Community Cleanup Initiatives:** Mobilize communities to participate in cleanup initiatives focused on removing plastic debris from natural environments, preventing further fragmentation into nanoplastics.
- **Local Action Plans:** Develop local action plans involving communities, businesses, and local authorities to address nanoplastic pollution at a regional level.

Role of International Cooperation, Technological Innovations, and Regulatory Frameworks in Addressing Nanoplastic Pollution:

International Cooperation:

- **Need for Global Standards:** International collaboration is crucial to establish global standards and guidelines for nanoplastic pollution assessment, monitoring, and mitigation. Shared data and standardized methodologies can facilitate a comprehensive understanding of the issue.
- **Joint Research Initiatives:** Collaborative research efforts among nations can accelerate the development of effective solutions. The sharing of expertise, resources, and best practices enhances the collective ability to address the complexities of nanoplastic pollution.

Example: The Global Partnership on Marine Litter (GPML), a collaborative initiative led by the United Nations Environment Programme (UNEP), promotes international cooperation to combat marine litter, including nanoplastics. Member countries share information and collaborate on research projects to address plastic pollution globally.

Technological Innovations:

- **Advanced Detection Technologies:** Innovations in detection technologies are crucial for accurate monitoring of nanoplastic levels in various environmental matrices. Advanced instruments, such as nanoparticle analyzers and spectroscopy techniques, enhance our ability to identify and quantify nanoplastic pollution.



- **Nanoplastic Filtration Systems:** Technological innovations in wastewater treatment plants can include the development of advanced filtration systems specifically designed to capture and remove nanoplastics before they enter natural water bodies.

Example: The European Union-funded project, GoJelly, explores the use of jellyfish-inspired robots equipped with innovative filtration systems to remove microplastics, including nanoplastics, from the oceans. This initiative showcases the potential of technological innovation in addressing nanoplastic pollution.

Regulatory Frameworks:

- **Ban or Restriction on Intentional Nanoplastics:** Regulatory measures can include the prohibition or restriction of intentional nanoplastics in consumer products, discouraging industries from using such materials where alternatives are available.
- **Extended Producer Responsibility (EPR):** Implementing EPR programs can hold manufacturers accountable for the entire lifecycle of their products, including proper disposal and recycling, promoting a circular economy.

Example: The European Chemicals Agency (ECHA) is actively exploring the regulation of intentionally added microplastics, including nanoplastics, in various products. This initiative reflects the role of regulatory frameworks in controlling the intentional use of potentially harmful particles.

Case Studies:

The Oslo Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR):

- **Objective:** OSPAR is a regional agreement aimed at protecting the marine environment of the North-East Atlantic.
- **Case Study:** OSPAR's Regional Action Plan on Marine Litter includes specific measures to address plastic pollution, including nanoplastics. This demonstrates the effectiveness of regional cooperation in addressing shared environmental challenges.

Taiwan's Microbead Ban:

- **Objective:** Taiwan implemented a ban on the production and sale of products containing microbeads in personal care items.



- Case Study: This regulatory intervention is an example of a national-level policy aimed at reducing intentional microplastic usage, showcasing the role of regulatory frameworks in curbing the introduction of harmful particles into the environment.

Project AWARE's Dive Against Debris:

- Objective: Project AWARE, a global non-profit organization, engages scuba divers in underwater cleanup initiatives to address marine debris, including micro and nanoplastics.
- Case Study: This project highlights the role of international non-governmental organizations (NGOs) and community engagement in addressing nanoplastic pollution through hands-on activities and awareness campaigns.