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## **SCIENCE & TECHNOLOGY**

### **GLOBAL**

#### **[China Scientists Carry Out AI Experiment in Space](#)**

Chinese researchers from Wuhan University conducted an experiment in which an artificial intelligence machine was given temporary full control of a satellite in near-Earth orbit, in a landmark experiment to test the technology's behaviour in space. For 24 hours the Qimingxing 1, a small Earth observation satellite, was directed by a ground-based AI, without any human order, assignment or intervention. The aim of the experiment was to see what the AI would do of its own accord. The AI picked a few places on Earth and ordered the Qimingxing 1 to take a closer look. While AI technology has been increasingly used in space missions – including for image recognition, drawing flight paths and collision avoidance – it has not been given control of a satellite. An AI-controlled satellite could alert select users – including the military, if it detected unusual objects or activity. The AI's decision-making process was extremely complex, considering many factors – such as real-time cloud conditions, camera angles, target value and the limits of a satellite's mobility when planning work. There are concerns about what could happen if a large language model gained access to flight control and learned how to operate a satellite.

#### **[Wearable Patch Can Painlessly Deliver Drugs through the Skin](#)**

MIT researchers have developed a wearable patch that applies painless ultrasonic waves to the skin, creating tiny channels that drugs can pass through. The device consists of a patch embedded with several disc-shaped piezoelectric transducers, which can convert electric currents into mechanical energy. Each disc is embedded in a polymeric cavity that contains the drug molecules dissolved in a liquid solution. When an electric current is applied to the piezoelectric elements, they generate pressure waves in the fluid, creating bubbles that burst against the skin. These bursting bubbles produce microjets of fluid that can penetrate through the skin's tough outer layer, the stratum corneum. Both mechanical and biological aspects of drug delivery can be improved by this method. The patch is made of PDMS, a silicone-based polymer that can adhere to the skin without tape. The researchers tested the device by delivering

a B vitamin called niacinamide using pig skin, and found the amount of drug that penetrated the skin was 26 times greater with ultrasonic assistance. The patch was able to deliver the same amount of niacinamide in 30 minutes that could be delivered with microneedles over a six-hour period. With further modifications to increase the penetration depth, this technique could also be used for drugs that need to reach the bloodstream, such as caffeine, fentanyl, or lidocaine. The researchers are also exploring the possibility of implanting similar devices inside the body to deliver drugs to treat cancer or other diseases.

### **Vaccine Printer Could Help Vaccines Reach More People**

MIT researchers have designed a tabletop-sized vaccine printer that could be scaled up to produce hundreds of vaccine doses in a day and deployed anywhere vaccines are needed. The Mobile vaccine printer could be scaled up to produce hundreds of vaccine doses in a day. This kind of printer, which can fit on a tabletop, could be deployed anywhere vaccines are needed. The printer produces patches with hundreds of microneedles containing vaccines. The patch can be attached to the skin, allowing the vaccine to dissolve without the need for a traditional injection. Once printed, the vaccine patches can be stored for months at room temperature. The researchers showed they could use the printer to produce thermostable Covid-19 RNA vaccines that could induce a comparable immune response to that generated by injected RNA vaccines, in mice. When the patch is applied to the skin, the tips of the needles dissolve under the skin, releasing the vaccine. The "ink" that the researchers use to print the vaccine-containing microneedles includes RNA vaccine molecules that are encapsulated in lipid nanoparticles, which help them to remain stable for long periods of time.

### **Virgin-Grade Materials from Wind Turbine Blades**

Aarhus University researchers have developed a chemical process that can disassemble the epoxy composite of wind turbine blades and simultaneously extract intact glass fibers as well as one of the epoxy resin's original building blocks in a high quality. The recovered materials could potentially be used in the production of new blades. The new chemical process is not limited to wind turbine blades but works on many different so-called fibre-reinforced epoxy composites, including some materials that are reinforced with especially costly carbon fibres. The process can contribute to establishing a potential circular economy in the wind turbine, aerospace, automotive and space industries, where these reinforced composites, due to their lightweight and long durability, are used for load-bearing structures. Researchers have shown that by using a ruthenium-based catalyst and the solvents isopropanol and toluene, they can separate the epoxy matrix and release one of the epoxy polymer's original building blocks, bisphenol A (BPA), and fully intact glass fibres in a single process. Therefore, the scientists from Aarhus University are continuing their work on improving this methodology.

### **Progress in Alternate Battery Technology**

Researchers at ETH Zurich have devised a strategy that brings key advances to the development of such zinc batteries, making them more powerful, safer and more environmentally friendly. Water-based Zinc batteries offer a promising alternative to these lithium-ion batteries. ETH researchers have tested their new battery strategy on a relatively small laboratory scale. They didn't use any environmentally harmful salts for their improvements, opting instead for environmentally friendly salts of acetic acid, called acetates. The next step will be to scale up

the approach and see if it can also be translated for large batteries. There are still some challenges to overcome before zinc batteries will be ready for the market.

### [Drug for Alzheimer's Shows Promise](#)

A team led by UCL and UCLH has found a new genetic therapy for Alzheimer's disease that is able to safely and successfully lower levels of the harmful tau protein known to cause the disease. The approach uses a drug called BIIB080 (*IONIS-MAPTRx*), which is an antisense oligonucleotide (used to stop RNA producing a protein), to 'silence' the gene coding for the tau protein -- known as the microtubule-associated protein tau (MAPT) gene. This prevents the gene from being translated into the protein in a doseable and reversible way. It will also lower the production of that protein and alter the course of disease. Phase 1 trials looked at the safety of BIIB080, what it does in the body, and how well it targets the MAPT gene. Results show that the drug was well tolerated, with all patients completing the treatment period and over 90% completing the post-treatment period. Patients in both the treatment and placebo groups experienced either mild or moderate side effects -- the most common being a headache after injection of the drug. However, no serious adverse events were seen in patients given the drug.

### [Quantum Arrays developed](#)

Researchers from the Centre for Quantum Technologies at the National University of Singapore have developed a novel method to pristinely arrange rubidium atoms into arrays about as wide as a human hair with the use of optical tweezers. Using their automated setup powered by a novel algorithm, the team realised a defect-free 225-atom array with a success probability of 33 per cent. This is among the highest success probabilities reported in the literature for room temperature setups. Quantum arrays can help scientists to perform powerful quantum simulations of materials. They rearranged multiple atoms with several optical tweezers, making it more efficient and flawless than existing methods that only move one atom at a time using a single optical tweezer. The researchers demonstrated their approach by using it to shape arbitrary geometries, such as the honeycomb, kagome, and link-kagome, which are useful in studying different advanced materials such as graphene, superconductors, or quantum spin liquids.

## **INDIA**

### [CSIR and OIL Sign an Umbrella Memorandum of Understanding \(MoU\)](#)

The Council of Scientific and Industrial Research (CSIR), New Delhi and Oil India Ltd. (OIL), signed an umbrella Memorandum of Understanding (MoU) to pursue technological partnership in select domains across the Energy value chain. The objective of the MoU is to facilitate collaboration for pursuing research in advanced technologies for energy security. The preliminary areas identified for Joint R&D activities and technology partnership include: New frontier areas in hydrocarbon exploration; New and renewable energy, batteries/storage systems; Green and Renewable Hydrogen / Biohydrogen; Reducing environmental pollution and bioremediation; Waste treatment ;Extraction of Lithium and Rare Earth Elements from Oilfield Water, etc. Both organizations have also agreed to work towards capacity building through training and skill development.

### **Test of BMD Interceptor from Naval Platform**

Defence Research and Development Organisation (DRDO) and Indian Navy successfully conducted a maiden flight trial of sea-based endo-atmospheric interceptor missile off the coast of Odisha in the Bay of Bengal on April 21, 2023. The purpose of the trial was to engage and neutralize a hostile ballistic missile threat thereby elevating India into the elite club of Nations having Naval BMD capability. Prior to this, DRDO has successfully demonstrated land-based BMD systems with capability to neutralize ballistic missile threats, emerging from adversaries. Chairman DRDO said that India has achieved self-reliance in developing highly-complex network-centric anti-ballistic missile systems.

### **India Launches National Quantum Mission**

India's government has approved the National Quantum Mission (NQM) at a total cost of Rs 60 billion over the period 2023-2030. NQM aims to seed, nurture and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in Quantum Technology (QT). The new mission targets developing intermediate-scale quantum computers with 50-1000 physical qubits in 8 years in various platforms like superconducting and photonic technology. Satellite-based secure quantum communications between ground stations over a range of 2000 km within India, long-distance secure quantum communications with other countries, inter-city quantum key distribution over 2000 km as well as multi-node Quantum networks with quantum memories are also some of the deliverables of the Mission. The mission will help develop magnetometers with high sensitivity in atomic systems and Atomic Clocks for precision timing, communications and navigation. It will also support the design and synthesis of quantum materials such as superconductors, novel semiconductor structures and topological materials for the fabrication of quantum devices. Single photon sources/detectors, and entangled photon sources will also be developed for quantum communications, sensing, and metrological applications. Four Thematic Hubs (T-Hubs) will be set up in top academic and national R&D institutes in the domains - quantum computing, quantum communication, quantum sensing & metrology and quantum materials & devices. The hubs will focus on the generation of new knowledge through basic and applied research as well as promote R&D in areas that are mandated to them.

### **Improving Predictability of Indian Summer Monsoons**

Scientists at the Institute of Advanced Study in Science and Technology (IASST), Guwahati, along with their collaborators have found that the widely used sea surface temperature (SST) is inadequate for calculation of long-lead prediction of Indian Summer Monsoons (ISMR). The team devised a predictor discovery algorithm (PDA) that uses data over the entire tropical belt between 1871 and 2010. The newly devised algorithm powered by Artificial Intelligence can help increase the predictability of the ISMR 18 months ahead of the season. The algorithm uses a single ocean-related variable and could facilitate skillful forecasts of the ISMR in time for making effective agricultural and other economic plans for the country.

### **Wearable Sensors and Point-of-Care Diagnostics**

Researchers from the Institute of Advanced Study in Science and Technology (IASST), fabricated a device which is made up of reduced phosphorene quantum dots. The quantum dots show distinctive electrical performance in biomedical applications and so can be used in fabricating high-performance electrical biosensors. The fabricated device shows reversibility in

interaction with the uric acid, which repeatedly enables the use of the device for sensing experiments. It outperforms all currently available ones in terms of effectiveness and cost because it doesn't need any enzymes. The response of the fabricated device was investigated with real samples like human blood serum and artificial urine. The device so developed is simple, portable, cost-effective, and easy to fabricate for detecting uric acid with a limit of about 0.809  $\mu\text{M}$ . The device can be used for various applications such as wearable sensors and point-of-care diagnostics.

### Improved LEDs and Solar Cells

Researchers at Indian Institute of Science Education and Research in Bhopal have been successful in exploring the properties of transition metal dichalcogenides (TMDs), a class of advanced two-dimensional materials with unique electrical, optical, and mechanical properties. The research on Molybdenum Disulphide ( $\text{MoS}_2$ ), one kind of TMDs could pave the way for development of advanced optoelectronic devices such as phototransistors, light detectors, light-emitting diodes (LEDs) and solar cells. TMDs such as  $\text{MoS}_2$  nanosheets are semiconducting 2D layered materials, and their thickness-dependent band gap makes them a potential material for optoelectronic devices.

## **G-20 AND GLOBAL CHALLENGES**

### Japan, US and EU Block G7 from Setting Coal Phase Out Date

The G7 group of big, wealthy countries has failed to agree on a date by which they will stop making electricity with coal. At the G7 environment ministers meeting in Sapporo, the United Kingdom and Canada wanted to set a 2030 date for completing the goal of an accelerated phase out of domestic unabated coal power generation. France accepted this but they were opposed by Japan, the United States and the European Union. In the final 36-page communique, environment ministers said they would prioritise concrete and timely steps towards the goal of accelerating the phase-out of domestic unabated coal power generation. But they stopped short of setting a specific deadline. EU member state Poland currently plans to phase out coal by 2049. Japan, the G7 presidency holder, relies on coal for almost a third of its electricity generation. Japan strongly objected to ending coal and the full decarbonisation of the power sector by 2035. Japan is planning to build four new coal-fired power plants. China has over 300 coal power plants planned and now accounts for nearly three-quarters of the world's planned coal capacity.

### Sustainable Energy Transition Discussed at G20 RIIG Meeting

The G20 Research Innovation and Initiative Gathering (RIIG) Conference on Eco-Innovations for Energy Transition organised at Dharamshala, Himachal Pradesh, which concluded on 19th April 2023, brought together a total of 29 foreign delegates and 30 Indian experts and invitees from various scientific departments/ organisations in India. Topics discussed included smart energy transformation, storage, and management; mission-driven research in sustainable energy transitions; policy frameworks for research and innovation in carbon-neutral energy sources and green hydrogen, and cooperation among G20 members on specific thematic areas. The Research Innovation Initiative Gathering (RIIG) is a new initiative of G20 Forum, which was initiated during the Indonesian Presidency in 2022. The next RIIG meeting will be held in Diu on the topic of scientific challenges and opportunities for a sustainable blue economy. The RIIG

Meetings will conclude with the RIIG Summit and Research Ministers meeting in Mumbai on 5th July 2023, and a joint declaration will be adopted by G20 members.

### **Precursor Event for the 4th Edition of G20-SELM in Shillong**

The precursor event of the 4th edition of the G20 Space Economy Leaders Meeting (SELM) was held during April 17-18, 2023 in Shillong. This two-day event was a forerunner for the 4th edition of SELM to be held in Bengaluru on July 6-7, 2023. Chief Minister of Meghalaya narrated how the Space applications have enabled the growth of the North Eastern Region and Meghalaya. Dr Jitendra Singh, MoS PMO, said that India has established end-to-end capabilities in Space technology and the response to the 2020 space sector reforms is overwhelming. G20 countries presented their perspectives on the Space Economy, and the challenges faced. An awareness-building session covered 'Space Economy: Policy perspectives'. The precursor event successfully enhanced the awareness of the contribution of space to the global economy. The theme of the 4th edition of SELM is "SELM: towards a new space ERA (Economy, Responsibility, Alliance)". The Heads of National Space Agencies and leaders of space industries of G20 and Guest nations are expected to participate in the SELM.

### **Meeting of G20 Agriculture Chief Scientists (MACS)**

The Meeting of Agricultural Chief Scientists (MACS) of G20 nations on “Sustainable Agriculture and Food System for Healthy People and Planet” was held in Varanasi, 17-19 April. About 80 delegates from G20 Member States; Invited Guest Countries, and International Organizations participated in the meeting. The discussions were focused on Agri-Food Systems Transformation, Frontiers in Science and Technology, Biofortification in Food Crops, Tropical Seaweed Farming, Millets And other Ancient Grains, One Health, Transboundary Pests and Diseases, Climate Resilient Technologies, and Digital Agriculture, Smallholder and Family Farming, G20- Global South Cooperation for Agri-R&D. The meeting adopted chair summary cum outcome document focussing on major areas of cooperation in agricultural research and development. On the side lines of G20 MACS, bilateral meetings were held with France, United Kingdom, Argentina and Germany for future collaboration in agriculture research. The bilateral meeting was also held with the Food and Agriculture Organization, Rome, Italy. The MACS Chair thanked all the delegates for their participation & contribution and handed over the MACS Presidency to Brazil.

### **S20 Webinar on Combating Neo-Infections**

The Indian National Science Academy (INSA), organized a S20 Webinar on “An Integrated Approach to Combat Neo-Infections: A Way Forward, through Vaccines, Diagnostics and Therapeutics” involving experts from the G-20 countries like Australia, US, UK, Canada, South Africa, European Union, Brazil and Indonesia. This S20 webinar focused on discussing a need for collaborative models that would help to strengthen and support research and development (R&D) in Vaccines, Therapeutics, and Diagnostics (VTDs). Various specific suggestions of the panel members along with suggestions of the participants received during the feedback session would be utilized for developing a robust networked research ecosystem. The webinar got good response with more than 1500 registrations across the G-20 countries and more than 500 viewers across the virtual platforms.

### **G20 Health Working Group Meeting Discusses Health Track Priorities**

The 2nd Health Working Group meeting of the G20 discussed the three priorities of India's G20 Health track. It showcased India's medical tourism sector and India's innovative interventions in the digital healthcare arena. Three technical sessions covered (1) Health Emergencies Prevention, Preparedness and Response (HEPPR) (2) Strengthening Cooperation in Pharmaceutical Sector with Focus on Access and Availability to Safe, Effective, Quality and Affordable Medical Countermeasures, and (3) The draft Outcome Document discussed by G20 member states. Three panel discussions were held on (1) Innovations in Healthcare - Health service delivery aided by Technology Interventions. (2) Technology aiding Continuing of care - Harnessing the potential of real-world data/evidence for better patient outcomes and (3) Digital Public Goods (DPGs) to bridge the Digital Divide. Delegates visited the exhibition unveiling various digital health best practices that are being taken up in India and abroad.

### **IN BRIEF**

#### **Nanoparticles Provoke Immune Response Against Tumours but Avoids Side Effects**

MIT researchers have shown that when immunostimulatory prodrugs -- inactive drugs that require activation in the body -- are tuned for optimal activation timing, the drugs provoke the immune system to attack tumours without the side effects that occur when the active form of the drug is given. The researchers designed prodrugs with bottlebrush-like structures based on a class of compounds called imidazoquinolines (IMDs). Mice treated with these bottlebrush prodrugs designed with optimized activation kinetics showed a significant reduction in tumor growth, with no side effects. The researchers hope that this approach could be used to boost immune system responses in cancer patients, especially when combined with other immunotherapy drugs or cancer vaccines. The researchers tested the IMD bottlebrush prodrugs in two different mouse models of colon cancer. Because the prodrugs are so small (approximately 10 nanometers), they are able to efficiently accumulate in tumors. Once there, they get taken up by innate immune cells, where their linkers are cleaved. The resulting release of active IMDs causes immune cells to release cytokines and other molecules that create a pro-inflammatory environment. This series of events activates nearby T cells to attack the tumor. The ability of the bottlebrush prodrug strategy to change both where the drug accumulates in the body and when it is active is very attractive for activating immune responses against cancer or other disease safely.

#### **Novel Nanocages for Delivery of Small Interfering RNAs**

Small interfering RNAs (siRNAs) are novel therapeutics that can be used to treat a wide range of diseases. Netherlands researchers have developed dedicated molecular nanocages for siRNA delivery. The nanocages are constructions of small molecular building blocks, so-called ditopic ligands, that are connected using metal atoms. A typical cage consists of 12 metal atoms and 24 ligands, hence the abbreviation M12L24. The researchers designed and synthesized five different ligands to form molecular cages with different siRNA binding affinities. They then prepared a range of siRNA binding nanocages using platinum or palladium as connecting metal. The palladium nanocages are less stable in a cellular environment, and decomposition is one of the siRNA releasing mechanisms. The cages were used to deliver siRNA to human GFP-expressing cells, so that fluorescence measurements could establish successful siRNA delivery. Two types of human cell lines were used: HeLa and U2Os. The researchers could not only



demonstrate satisfying siRNA delivery, but also discovered a remarkable differentiation depending on the metal used in the nanocage. The M12L24 nanocages thus introduce the possibility of tuning siRNA delivery characteristics by tuning the nanocage composition. The tuneable RNA delivery of nanocages could lead to development of highly desirable selective RNA nanomedicines.

### [A Wound Dressing that Can Reveal Infection](#)

Researchers from Sweden have now developed a wound dressing made of nanocellulose that can reveal early signs of infection without interfering with the healing process. The dressing is made of tight mesh nanocellulose, preventing bacteria and other microbes from getting in. At the same time, the material lets gases and liquid through, something that is important to wound healing. The idea is that once applied, the dressing will stay on during the entire healing process. Should the wound become infected, the dressing will show a colour shift. Non-infected wounds have a pH value of about 5.5. When an infection occurs, the wound becomes increasingly basic and may have a pH value of 8, or even higher. An elevated pH value in the wound can be detected long before any pus, soreness or redness, which are the most common signs of infection. To make the wound dressing show the elevated pH value, the researchers used bromthymol blue, BTB, a dye that changes colour from yellow to blue when the pH value exceeds 7. For BTB to be used in the dressing without being compromised, it was loaded onto a silica material with pores only a few nanometres in size. The silica material could then be combined with the dressing material without compromising the nanocellulose. The result is a wound dressing that turns blue when there is an infection.

### [Efficient Engineering of Cell and Gene Therapies](#)

A new approach to the genetic engineering of cells promises significant improvements in speed, efficiency, and reduction in cellular toxicity compared to current methods. The approach could also power the development of advanced cell therapies for cancers and other diseases. Researchers at Penn Medicine found that protein fragments used by some viruses to help them get into cells could also be used to get CRISPR-Cas gene editing molecules into cells and their DNA-containing nuclei with extraordinarily high efficiency and low cellular toxicity. The scientists expect the new technique to be particularly useful for modifying T cells and other cells from a patient's own body to make cell therapies such as CAR T (chimeric antigen receptor T cell) therapy. This new approach called PAGE (peptide-assisted genome editing) has the potential to be a major enabling technology for engineered cellular therapies.

## **RESOURCES & EVENTS**

### [US Pledges \\$1 Billion to Green Climate Fund](#)

The US will provide \$1 billion to the UN's Green Climate Fund (GCF), its first such contribution in six years. President Joe Biden made the commitment as he hosted a virtual meeting of world leaders to spur high-level leadership to limit global warming to 1.5C. The move was part of a broad call to action to the Major Economies Forum on energy and climate, a group of more than 20 high-emitting developed and developing countries which account for around 80 per cent of global greenhouse gases. The \$1bn announcement only accounts for half of the \$2bn the US owes the fund after President Donald Trump reneged on a \$3bn pledge made under Barack

Obama almost a decade ago. Since then, European and other donors have doubled their pledges to the fund. Biden called on countries to speed up the deployment of carbon capture and removal technologies by joining the 'Carbon Management Challenge'. Scientists say carbon capture and removal technologies are needed to limit global warming to 1.5C by counter-balancing residual emissions from hard-to-abate sectors. However, such technologies remain underdeveloped and face technological, economic and environmental barriers.

### US Funds Carbon Capture Technology

The U.S. government has offered \$3.5 billion in grants to build the factories that will capture and permanently store Carbon Dioxide – the largest such effort globally to help halt climate change through Direct Air Capture (DAC) and expanded a tax credit of \$180/tonne to bolster this technology. Bids for the U.S. DAC hub funding were due on March 13, the government and the US Energy Department expects to announce winning bids this summer. The U.S. government has said it wants to back four hubs, and at least nine applications have been filed in a first round, with two major Occidental Petroleum projects also seen as strong contenders. Among the most active firms so far has been Swiss start-up Climeworks, which has raised more than \$800 million to date and is backed by Singaporean sovereign investor GIC.

### FAIR Industry Meet Held

The "FAIR Industry Meet" was held at Bose Institute, Kolkata during 12 to 13 April, 2023 to appraise the Indian industries regarding the opportunities as well as challenges in the various upcoming International scientific facilities, especially the Mega Science projects where India is playing a role. India is participating in the Facility for Antiproton and Ion Research (FAIR), an upcoming multipurpose particle accelerator coming up in Darmstadt, Germany where about 3000 scientists from over 50 countries in the world are working together. The contribution from India is the second largest next only to Germany. The Department of Science and Technology and the Department of Atomic Energy of the Government of India have come together to jointly fund this project. The participation of Indian industries in these large accelerator facilities will not only bring opportunities to the Indian industries to become more competitive in the global market, and will also equip them to contribute to the in-house facilities existing and upcoming in the country. Sixteen companies from different industry sectors relevant to the development and construction of a large size particle accelerator facility such as ultra-high vacuum, cryogenics, application specific integrated chip (ASIC) and sensor, printed circuit board manufacturing, heavy engineering, electrical and electronics attended the meeting. The Indo-German Chamber of Commerce also promised to act as a bridge between the scientific community and the industries.

## **SCIENCE POLICY AND DIPLOMACY**

### India-UK 'Net Zero' Innovation Virtual Centre

The India-UK Science & Innovation Council meeting in presence of Ministers from India and the UK announced the creation of an India-UK "NET Zero" Innovation Virtual Centre. The close collaboration between the two countries, strengthened through an ambitious 'Roadmap 2030' that provides a framework for UK-India relations across health, climate, trade, education, science and technology, and defence was highlighted. The India-UK Science & Technology (S&T) collaboration has now reached a level of £300-400 million now.. Both the leaders called

for newer collaborations for joint R & D Projects between BBSRC- DBT in the area of Farmed Animal disease and Health & MOES-NERC Call in the area of Solid Earth hazards.

### [Elements for the Plastics Treaty](#)

The Secretariat for the INC has published an [advance version of a paper](#) outlining elements that could potentially be included in an international plastics treaty currently under negotiation. The options are “based on a comprehensive approach that addresses the full life cycle of plastics.” The elements paper will inform deliberations at the second session of the intergovernmental negotiating committee (INC-2) to develop an international legally binding instrument on plastic pollution, including in the marine environment, pursuant to the mandate contained in the UN Environment Assembly’s (UNEA) “plastic pollution resolution” (UNEP/EA.5/Res.14). The paper draws on member States’ views expressed during INC-1 and on their written submissions covering the preamble, definitions, scope, and principles, as well as institutional arrangements related to the governing body, subsidiary bodies, scientific and technical cooperation and coordination, and the secretariat. The 37-page document, released on 13 April 2023, aims to facilitate the INC’s work without prejudging “what the committee might decide regarding the structure and provisions of the future instrument.” INC-2 will convene in Paris, France, from 29 May to 2 June. Options for the instrument’s objective, as reflected in the elements paper, range from ending plastic pollution and protecting human health and the environment, to reducing the production, use, and discharge of plastics across their life cycle.

### [Rescue Plan for People and Planet](#)

The UN has released a version of the UN Secretary-General’s annual report on SDG progress titled, ‘[Progress towards the Sustainable Development Goals: Towards a Rescue Plan for People and Planet.](#)’ It warns that “many of the SDGs are moderately to severely off track” and offers five recommendations to “rescue” the Goals by the 2030 deadline. The report reveals that according to a preliminary assessment of around 140 targets with data, only about 12 per cent are on track. Nearly 50 per cent of the targets are moderately or severely off track and approximately 30 per cent have either stagnated or “regressed below the 2015 baseline.” The report underscores that “developing countries and the world’s poorest and most vulnerable people are bearing the brunt” of it. It offers five broad recommendations and specifies a number of actions governments could take to support each.

We welcome your comments and valuable suggestions. Please write to us for receiving publications, updates and notices regarding seminars, conferences etc. Contact us at [science.diplomacy@ris.org.in](mailto:science.diplomacy@ris.org.in)

### **NOTE TO OUR READERS AND STAKEHOLDERS:**

RIS Science Diplomacy Programme ([fisd.in](http://fisd.in)) is glad to present a new version of Science Diplomacy News Alerts, following India’s assumption of the Presidency of the G20. A new section G20 and global challenges has been added. We request your cooperation to review the Alerts and improve its content. For this purpose, please complete the form at <https://forms.gle/o4d869FxaM9t3KNw7>, and submit it. Your support and cooperation is appreciated.

