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MINISTRY OF SCIENCE AND TECHNOLOGY



MK Yadav Sir

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SELF REGULATION ORG. FOR FINTECH

(Syllabus: GS Paper 3 – Economy)



PLAYING BY THE RULES

Why self-regulation is best for fintechs

The Reserve Bank of India has approved the Fintech Association for Consumer Empowerment as the fintech industry's first self-regulatory organisation (SRO-FT). *Jitendra Soni* explains how this will help capitalise on its growth potential while addressing the specific risks it poses to the financial system

What is SRO-FT?

AN SRO-FT IS an industry-led entity that establishes and enforces regulatory standards, promotes ethical conduct, ensures market integrity, resolves disputes, and fosters transparency and accountability among its members. It operates under the oversight of the Reserve Bank of India (RBI). As per the framework, a fintech entity can join multiple SROs and are encouraged to participate in at least one. The SRO-FT should be a fair and transparent arbiter of disputes, fostering a stable fintech environment. The SRO-FT should guide members to align with regulatory priorities, facilitate communication with the RBI, and enforce compliance while supporting innovation and consumer protection. Additionally, it should collect and share data on member activities to aid research, trend analysis, and policymaking, enhancing sector development and resilience.

Benefits of self-regulation

FROM THE REGULATOR'S perspective, self-regulation can help achieve the delicate balance between maximising the creative potential of fintechs while minimising the idiosyncratic risks they pose to the financial system. From an industry participant's perspective, self-regulation fosters a culture of self-discipline, high levels of internal governance and an environment conducive to an organised and orderly development of the sector. Overall, this approach enables the industry to adapt effectively to rapid technological advancements and evolving market dynamics.

FACE as the first SRO-FT

FINTECH ASSOCIATION FOR Consumer Empowerment (FACE) is a self-regulatory industry body for fintech lenders in India. Founded in the year 2020 by the fintech lenders Cashe, LoanTap, Fibe, KreditBee and Paysense, it has nearly 50 members today, collectively accounting for 80% of India's digital lending business volume.

On August 28, 2024, the RBI recognised FACE as India's first SRO-FT. FACE promotes responsible lending and borrowing by setting industry standards and ensuring ethical practices among its members.

How will the SRO-FT ensure that entities comply with the regulations?

AN SRO-FT IS tasked not only with framing various codes and standards for its members but also specifying the consequences for violations and enforcing them. These standards include code of conduct, industry benchmarks, standardised documents, accreditation mechanisms, advertising guidelines, baseline governance standards, and data protection and statutory compliance requirements. It can enforce its standards by monitoring activities of industry participants, imposing reasonable penalties and taking actions such as counselling, cautioning, reprimanding and expelling members. Fintech entities may be barred from membership temporarily or permanently, if necessary.

Eligibility and membership criteria

AN APPLICANT SRO-FT must be a not-for-profit company registered under Section 8 of the Companies Act, 2013, with diversified shareholding where no single entity holds 10% or more of the share capital, either individually or in concert. Within a year of recognition or before commencing operations (whichever is earlier), it must have a minimum net worth of ₹2 crore.

It must represent the fintech sector with fintech entities of all size, stage and activities as members, with membership being voluntary. It must be based in India but can include fintechs from outside the country. Membership should primarily consist of fintechs not regulated by any financial sector regulator, although it may also include regulated entities, excluding banks. Membership agreements must be drawn to set rules, standards, codes of conduct, etc., for its members. The application must include a detailed justification of how it will meet the characteristics of an SRO-FT and a comprehensive explanation of how it will perform the responsibilities and functions under the SRO framework.

Impact on the industry

DESPITE ITS PROMISE to accelerate credit access, the fintech industry has faced numerous challenges. Unscrupulous digital lending players with abusive practices attracted intense scrutiny from enforcement agencies, affecting even the most legitimate fintechs. This, coupled with uncertainties around first loss default guarantee (FLDG) structures with lending entities and regulatory compliance issues, had made it difficult for fintechs to operate smoothly. Simply put, it has been caught between the governance norms imposed by regulated entities and the regulatory scrutiny targeting fringe players. In this context, FACE's recognition as an SRO-FT is crucial, offering fintechs an opportunity to set their own standards and self-regulate.

The writer is a partner with the technology practice of Argus Partners, Solicitors and Advocates

80% OF INDIA'S DIGITAL LENDING BUSINESS VOLUME COMES FROM 50 FINTECHS

RBI RECEIVED APPLICATIONS FROM THREE ENTITIES FOR BEING RECOGNISED AS SROs FOR THE FINTECH SECTOR

₹98,111 cr WORTH OF PERSONAL LOANS SANCTIONED BY FINTECH NBFCs IN FY 23-24

Context: The Reserve Bank of India has approved the Fintech Association for Consumer Empowerment as the fintech industry's first self-regulatory organisation (SRO-FT).

Benefits of Self-Regulation

- **Balance for Regulators**: Self-regulation helps regulators balance fintech creativity with the risks it poses to the financial system.
- **Self-Discipline in Industry**: Self-regulation fosters a culture of self-discipline and strong internal governance among fintech entities.
- **Orderly Sector Development**: It creates an environment conducive to the organised and orderly development of the fintech sector.
- **Adaptability to Technological Advancements**: This approach allows the industry to effectively adapt to rapid technological changes and evolving market dynamics.

SRO-FT

- **About**: It is an industry-led entity that establishes and enforces regulatory standards, promotes ethical conduct, ensures market integrity, resolves disputes, and fosters transparency and accountability among its members.
- **Operate under:** Reserve Bank of India (RBI)
- **Promotes Ethical Conduct:** SRO-FT fosters ethical behavior and integrity among its members, ensuring that businesses operate responsibly.
- **Ensures Market Integrity**: It works to maintain the stability and fairness of the fintech market, ensuring that members comply with regulations.
- **SRO Memberships Allowed**: Fintech entities are allowed to join multiple SROs and are encouraged to participate in at least one.
- **Data Collection for Research and Policymaking**: SRO-FT collects and shares data on member activities, aiding research, trend analysis, and policymaking to strengthen sector development.
- **Eligibility and membership Criteria**: SRO-FT must be a not-for-profit company registered under Section 8 of the Companies Act, 2013, with diversified shareholding where no single entity holds 10% or more of the share capital, either individually or in concert.
    - Within a year of recognition or before commencing operations (whichever is earlier), it must have a minimum net worth of Rs 2 crore.
- **FACE as the first SRO-FT:** It is a self-regulatory industry body for fintech lenders in India.
    - **Founded**: 2020 by the fintech lenders Cashe, LoanTap, Fibe, KreditBee and Paysense.
    - **Members**: it has nearly 50 members.
    - RBI recognised FACE as India's first SRO-FT. FACE promotes responsible lending and borrowing by setting industry standards and ensuring ethical practices among its members.

THE PRINT Sep 10

PAHADI KORWA COMMUNITY
(Syllabus GS Paper 1 – Indian Society)

54 settlements of Pahadi Korwa tribal community in north Chhattisgarh to get roads

Context: As many as 54 settlements of Pahadi Korwa community will be connected through roads in north Chhattisgarh under the Prime Minister JANMAN scheme.

Pahadi Korwa Community

- **About:** It is one of the oldest and an indigenous tribe of Chhattisgarh.
- **District**: Mahuapani is home to over 100 families from the Pahadi Korwa tribe, a Particularly Vulnerable Tribal Group (PVTG).
    - **Five PVTGs**: Abhujmaria, Kamar, Pahadi Korwa, Birhor and Baiga – with a population of around 1.80 lakh reside in Chhattisgarh
- **Lifestyle**: It depends on the forests and mountains. The people of the village make a living through hunting, gathering medicinal herbs and practising traditional agriculture.
- **Language**: The primary language spoken by the Korwa people is the Korwa language, also known as Ernga or Singli.
- **Occupation**: Pahadi Korwa people depend on small-scale farming, fishing, hunting, and foraging from forests for their livelihood.
    - They practice subsistence agriculture, particularly "jhoonga kheti," which involves clearing forests to grow lentils and other crops.
- **Governance**: The Korwa tribe has its own local panchayat, where justice is administered.
- **Religion and Worship**: Their important gods include Sigri Dev, Gauria Dev, Mahadev (Lord Shiva), and Parvati.
    - Khudia Rani is regarded as the supreme god of the Pahadi Korwa community.

INDIAN EXPRESS

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SPACEWALK

(Syllabus: GS Paper 3 – Sci and Tech)



Everything about Polaris Dawn mission, which will attempt first private spacewalk

ALIND CHAUHAN
NEW DELHI, SEPTEMBER 10

A SPACEX Falcon 9 rocket lifted off from Florida on Tuesday, carrying American billionaire Jared Isaacman and three others into orbit to attempt the world's first private spacewalk.

The five-day mission, known as Polaris Dawn, is the first of three testing and development missions under the Polaris Program, which will be jointly executed by Isaacman and Elon Musk's SpaceX. The program aims to develop new technologies that could be used to send people to Mars some day.

Tuesday's launch was originally scheduled for August 28, but was delayed due to a helium leak. It was again postponed due to bad weather around Florida.

First, what exactly is a 'spacewalk'?

A spacewalk or an "extravehicular activity (EVA)" is a period of activity spent outside a spacecraft by an astronaut in space.

The first-ever spacewalk was carried out on March 18, 1965, by the Soviet cosmonaut Alexei Leonov at the height of the Space Race — the 20th century competition between the US and USSR over who could conquer space exploration first — during the Cold War. Leonov's walk lasted 10 minutes.

Today, spacewalks are usually done outside the International Space Station (ISS) and can last between five and eight hours.

Spacewalks are done for several reasons, including to carry out science experiments. Astronauts can attach experiments to the outside of a spacecraft during their spacewalk, and observe how the space environment impacts different things. They can also test new equipment, and repair satellites or their spacecraft during the walk.

To carry out a spacewalk, astronauts have to wear a spacesuit and use rope-like safety tethers to attach themselves to their spacecraft. "One end is attached to the spacewalker. The other end is connected to the vehicle. The safety tethers keep astronauts from floating away into space," according to NASA, the US space agency.

The other way is to wear a SAFER (Simplified Aid for EVA Rescue). It is put on like a backpack, and consists of small jet thrusters to help an astronaut move around in space. SAFER is controlled by astronauts with a small joystick.

EXPLAINED SCIENCE

Who is on board Polaris Dawn?

At the helm of the Polaris Dawn mission is Isaacman, who is the founder of the electronic payment company Shift4. He has bankrolled the mission along with SpaceX, and is the commander of the crew.

This is Isaacman's second trip into space. In 2021, he went into low-Earth orbit for three days, and then splashed down off Florida.

Apart from Isaacman, the crew comprises Scott Poteet, a retired US Air Force lieutenant colonel; and two SpaceX employees, Anna Menon, a lead space operations engineer, and Sarah Gillis, an engineer who oversees astronaut training.

What are the mission's objectives?

The crew, who are travelling in SpaceX's Dragon capsule, will first aim to get a maximum of about 1,400 km from Earth. This will be farther away from the 1,372 km altitude that NASA's Gemini XI mission reached in 1966, the record for any crewed mission that was not headed to the Moon.

That height means that the Polaris Dawn mission will be well into the inner band of the Van Allen radiation belts — regions in space that encircle the Earth and are highly radioactive — which begins at around 1,000 km altitude. The crew will use this opportunity to "conduct research with the aim of better understanding the effects of spaceflight and space radiation on human health", according to the mission's website.

Subsequently, the capsule would drop to a lower orbit for the rest of the mission, which includes a spacewalk. The spacewalk is scheduled for Thursday, the third day of the mission.

For the spacewalk, all crew members will put on spacesuits and then, all of the air will be let out of the capsule. "The hatch will then be opened and the inside of the spacecraft will become part of the vacuum of outer space," *The New York Times* said.

Only two crew members — Isaacman and Gillis — will leave the capsule for the spacewalk. Poteet and Menon will stay inside to manage the safety tethers and observe readings to ensure that nothing goes awry.

The spacewalk's main aim is to test the spacesuits, developed by SpaceX for this mission. Known as EVA spacesuits, they are equipped with cameras and heads-up displays that display to the astronauts information about the status of their suits outside their vehicle, according to a report by *Euro News*. The suits also feature an "improved thermal management", the report said.

Once Isaacman and Gillis return inside, the hatch will be closed and the capsule will be repressurised.

During the mission, the crew will conduct 40 scientific experiments. This includes trying to obtain X-ray images without an X-ray machine, with the help of natural showers of radiation in space.

The crew will also test laser-based communication provided by SpaceX's Starlink satellite network. This technique allows communication among satellites without relying on ground infrastructure to send signals.

Context: A spaceX Falcon 9 rocket lifted off from Florida, carrying American billionaire Jared Isaacman and three others into orbit to attempt the world's first private spacewalk.

Polaris Down

- **About:** It is the first of three testing and development missions under the Polaris Program, which will be jointly executed by Isaacman and Elon Musk's SpaceX.
- **Objective**: The program aims to develop new technologies that could be used to send people to Mars some day.
- It is five day program.

Objective of the Mission

- To travel in SpaceX's Dragon capsule to reach a maximum altitude of about 1,400 km from Earth, surpassing NASA's Gemini XI mission record of 1,372 km from 1966.
- At this altitude, the Polaris Dawn mission will enter the inner band of the Van Allen radiation belts, which begins around 1,000 km. This region is highly radioactive.
- After reaching the maximum altitude, the capsule will descend to a lower orbit for the remainder of the mission, which includes a scheduled spacewalk.
- The main objective of the spacewalk is to test SpaceX's newly developed EVA spacesuits. These suits feature cameras, heads-up displays, and improved thermal management.

Spacewalk

- **About:** A spacewalk, also known as an Extravehicular Activity (EVA), is an activity performed by astronauts outside their spacecraft while in space.
- **The First Spacewalk**: It was carried out by Soviet cosmonaut Alexei Leonov on March 18, 1965, during the Space Race between the US and the USSR. His walk lasted 10 minutes.
- **Modern Spacewalks**: It typically take place outside the International Space Station (ISS) and can last between five to eight hours.
- **Purposes:** Spacewalks are conducted for various reasons, such as conducting scientific experiments, testing equipment, and repairing satellites or spacecraft.
- **Spacesuits and Safety Tethers**: During a spacewalk, astronauts wear spacesuits and use safety tethers, attaching one end to themselves and the other to the spacecraft, to prevent floating away.
- **SAFER for Movement in Space**: Astronauts can also use SAFER (Simplified Aid for EVA Rescue), a backpack with jet thrusters controlled by a joystick, to navigate in space during a spacewalk.

PIB

Sep 10

SWACHH VAYU SARVEKSHAN AWARD 2024

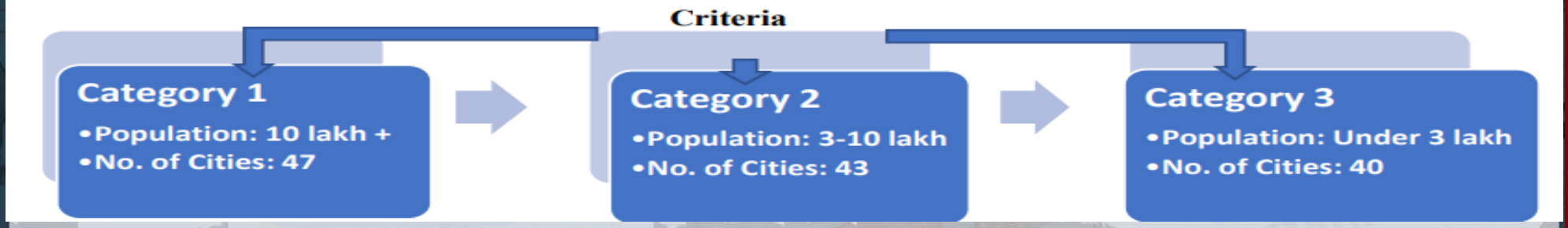
(Syllabus: GS Paper 2 – Gov. Policies)

Union Environment Minister Bhupender Yadav and Chief Minister of Rajasthan Bhajan Lal Sharma presented Swachh Vayu Survekshan Award, 2024

Context: The Union Minister of Environment, Forest and Climate Change presented the Swachh Vayu Sarvekshan Award 2024 on the occasion of the International Day of Clean Air for Blue Skies.

Swachh Vayu Sarvekshan Award 2024

- **About:** It is an initiative by MoEF&CC to rank cities on the basis of implementation of activities approved under city action plan and air quality in 130 NCAP cities.
- **Host**: Rajasthan State Pollution Control Board.
- **Objectives**: To create awareness among all sections of the society
  - Inform citizens about the health impacts related due to exposure
  - Comparing air quality conditions at different locations/cities
  - To achieve the goal of NCAP "Clean air for all".
- **Swachh Vayu Diwas**: 7 September
- **Award Category:**
  - **Category-1 (population over 10 Lakhs)**: Surat, Jabalpur, and Agra.
  - **Category-2 (population between 3 and 10 Lakhs)**: Firozabad, Amravati, and Jhansi
  - **Category-3 (population under 3 Lakhs):** Raebareli, Nalgonda, and Nalagarh.



TIMES OF INDIA

Sep 10

MYRISTICA SWAMP FOREST

(Syllabus: GS Paper 3 – Env and Eco)

Myristica swamp forest discovered in Kumbral

Context: Researchers recently discovered a Myristica swamp forest in Kumbral, Maharashtra, safeguarded by the local community. This rare ecosystem highlights the community's role in preserving biodiversity.



Myristica Swamp Forest

- **About:** These are freshwater ecosystems dominated by evergreen trees belonging to the Myristicaceae family.
- **Distribution**: In India, Myristica swamps are primarily found in the Western Ghats, with smaller patches in the Andaman and Nicobar Islands and Meghalaya.
- **Fossils:** These swamps are referred to as "living fossils" due to the ancient and primitive nature of Myristica plants.
- **Evolution**: With an origin dating back approximately 140 million years, Myristica swamps are crucial for evolutionary studies.
    - Historically, these swamps formed extensive hydrological systems throughout the Western Ghats.
- **Structures**: The forests are characterized by large, protruding roots emerging from waterlogged soil, which remains flooded throughout the year.
- **Swamp Formation**: Their formation depends on specific abiotic factors such as valley shapes, annual rainfall (around 3000 mm), and year-round water availability.
    - Typically located near rivers, Myristica swamps act as natural sponges, retaining water and ensuring perennial water flow.
- **Significance**: These forests have a greater ability to sequester carbon compared to non-swamp forests.
- Due to stable ecological conditions like high humidity and moderate temperatures, these swamps support a rich diversity of vertebrate and invertebrate species.
- **Example Species**: One notable species is the Myristica Swamp Treefrog (Mercurana myristicapalustris), found only in select areas of Kerala's Shendurney and Peppara Wildlife Sanctuaries.

THE HINDU Page 12

ANUSANDHAN NATIONAL RESEARCH FOUNDATION

(Syllabus: GS Paper 3 – Sci and Tech)

PM Modi convenes first meeting of National Research Fund board

The Hindu Bureau
NEW DELHI

Prime Minister Narendra Modi on Tuesday convened the first meeting of the Governing Board of the Anusandhan National Research Foundation.

During the meeting, Mr. Modi said that a new beginning had been made, according to an official statement. The Prime Minister stressed the need to identify and remove obstacles in the country's research ecosystem. There was a need to set big targets, focus on attaining them, and on doing path-breaking research. Mr. Modi said that research ought to be focused on finding new solutions to existing problems.

He emphasised that problems might be global in nature but their solutions must be localised in accordance with Indian needs.

During the meeting, the governing body decided to launch a programme in the 'hub and spoke model' by pairing universities where research is at nascent stage with top-tier established institutions in mentorship mode.

They also discussed several areas of strategic interventions by the ANRF, which include the global positioning of India in key sectors, aligning R&D with national priorities, promoting inclusive growth, capacity building, driving scientific advances and innovation ecosystems, as well as bridging the gap between academic research and industrial applications through industry-aligned translational research.



Setting targets: Prime Minister Narendra Modi chairs the first meeting of the newly formed ANRF in New Delhi on Tuesday. ANI

A funding body

The ANRF was conceived as a funding body to galvanise science and engineering research in the country.

It was conceived as a step-up over existing funding arrangements and meant to encourage research funding to State universities, and to have private industry participate more actively in funding basic research and development.

The ANRF aims to establish a ₹50,000 crore corpus with ₹36,000 crore of it coming in from non-government sources. For the current financial year, the ANRF has been earmarked ₹2,000 crore in the Union Budget.

The 15-member Governing Board, as notified by the Ministry of Science and Technology, has only one industrialist – Romesh Wadhwani, an American billionaire of Indian origin and former CEO and chairperson of the Symphony Technology Group.

Context: Prime Minister Narendra of India chaired the first governing board meeting of the newly formed Anusandhan National Research Foundation (ANRF).

Anusandhan National Research Foundation (ANRF)

- **About**: This initiative is a crucial step in pushing India towards becoming a knowledge-driven society, following the model of research powerhouses like the US, Germany, South Korea, and Israel.
- **Established under**: Anusandhan National Research Foundation (ANRF) 2023 Act.
- **Inspired by:** US National Science Foundation (NSF),
- **Objective**: The foundation aims to fund, coordinate, and promote research across India's universities and colleges, which have long suffered from a lack of infrastructure, particularly in state-run institutions.
    - One of ANRF's key goals is to bridge the infrastructure gap in state and central universities, which enroll 95% of students but often lack research capabilities.
- **Focus:** Supporting lower Technology Readiness Levels (TRLs) is also vital. Academic institutions are better suited for this stage of research, where capital requirements are lower, failure rates are higher, and students can contribute significantly to long-term projects.
- **Financial Framework**: The total budget for the initiative is Rs 50,000 crore over five years, with Rs 14,000 crore provided by the government. The remaining funds are to be sourced from non-governmental entities such as industry and philanthropists.

TIMES OF INDIA

Sep 10

ELONGATED TORTOISE

(Syllabus: GS Paper 3 – Env and Eco)

Elongated tortoise spotted in Damdama for first time

Context: Recently, the elongated tortoise was spotted in Haryana's Damdama area during a research survey in the Aravallis.

Elongated Tortoise

- **About:** The tortoise is medium-sized, featuring a yellowish brown or olive shell with distinct black blotches at the center of each scute.
- **Nostril Ring:** A pink ring appears on the nostril during the breeding season.
- **Seasonal Coloration**: Mature individuals of both sexes develop a pinkish color around the nostrils and eyes during the breeding season.
- **Geographic Distribution**:
- **Southeast Asia Range**: Found in Sal deciduous and hilly evergreen forests across Southeast Asia, including northern India, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, Indochina, Guangxi Province of China, and Peninsular Malaysia.
- **Population**: A separate population exists in the Chota Nagpur plateau in eastern India.
- **Habitat**: Lowlands and foothills up to 1,000 meters above sea level.
- **Conservation Status**:
  - **IUCN Red List:** Elongated tortoises were assessed by the IUCN in 2018 and are listed as critically endangered under criteria A2cd.



INDIAN EXPRESS Page 15

ANTIMICROBIAL RESISTANCE (AMR)

(Syllabus: GS Paper 3 – Sci and Tech)



The grave threat from AMR

Antimicrobial resistance, which is caused when microbes evolve into drug-resistant 'superbugs' in response to the misuse or overuse of antibiotics, is a growing problem in India. Who is responsible; what can be done?

ANONNA DUTT
NEW DELHI, SEPTEMBER 10

AHEAD OF the September 26 UN General Assembly High-Level Meeting on antimicrobial resistance, the World Health Organization last week published its first-ever guidance on antibiotic pollution from manufacturing.

"The emergence and spread of AMR (antimicrobial resistance) caused by antibiotic pollution could undermine the effectiveness of antibiotics globally, including the medicines produced at the manufacturing sites...," the WHO said on September 3.

AMR — and consequently, the creation of "superbugs" — affects healthcare everywhere, but has especially poor outcomes in patients suffering from multiple diseases. A survey by the Indian Council of Medical Research (ICMR), the country's apex body for the formulation, coordination and promotion of biomedical research, shows that AMR continues to rise across the country.

"...Common pathogens are becoming more and more resistant to antibiotics. This increase has been noted despite the fact that the number of samples and the centres at which we carry out surveillance has remained the same over the years," Dr Kamini Walia, one of the authors of the recently released ICMR annual report on Antimicrobial Resistance Research and Surveillance Network (January-December 2023), said.

Dr Walia described this situation as a "symptom". "We have to make changes across the board to ensure the antibiotics that we have remain effective," she said.

What is antimicrobial resistance (AMR) and why is it a cause for concern?

AMR is a condition in which a pathogen acquires the ability to survive and cause infection even in the presence of an antimicrobial drug. AMR is the result of evolution of microbes in a situation where there is a misuse or overuse of antibiotics.

Excessive use of antimicrobial drugs can lead to the creation of resistant or extremely resistant superbugs, which can circulate in hospitals, through drinking water, or sewers. Infections caused by these pathogens will not respond to commonly prescribed antibiotics.

Growing antibiotic resistance would mean that simple infections would become difficult to treat — for example, doctors have reported patients requiring admission to hospital for the treatment of even urinary tract infections. Within hospitals, this is likely to lead to more complications and longer stays, making the treatment increasingly more expensive.

Why is AMR increasing?

MOST COMMON PATHOGENS FOUND IN INDIA

Type of facility	Most commonly isolated pathogen	What the pathogen does	Resistance
ICU	*Acinobacter baumannii*	It can cause pneumonia, infections of the blood, urinary tract, and on wounds. It is becoming an important hospital-derived infection.	Continues to have 88% resistance to third-line, strong antibiotics like carbapenem
Wards & OPD	*E. coli*	May cause diarrhoea, UTI, pneumonia, and sepsis	Continues to show increased resistance to most classes of antibiotics, including carbapenem for which it went up from 18.6% in 2017 to 37.3% in 2023

MOST COMMON PRESCRIPTIONS

71.90% patients coming to tertiary hospitals are prescribed antibiotics

No. of people on one antibiotic 47%
No. of people on two antibiotics 35%
No. of people on three antibiotics 18%

Source: Annual report of the Antimicrobial Resistance Research and Surveillance Network, NCDC's first Antimicrobial Resistance Survey

INDIVIDUALS: Many Indians have a tendency to pop an antibiotic for a fever, without even checking if the fever is caused by a bacterium. An antibiotic is of no use for viral infections such as influenza, but consuming it can drive up resistance in the population.

Many find it difficult or expensive to go to a doctor for a simple sickness, and instead prefer to take a pill that perhaps their local chemist has recommended. Dr Walia said that it is not fair to ask people who are only trying to get better quickly, to not consume antibiotics.

"Instead, we have to prevent infections so that people do not feel the need to take antibiotics," she said. "This can be achieved through improving hygiene and measures like frequently washing hands.

"It can also be achieved through vaccinations. For example, the pneumococcal vaccine or influenza vaccine for the elderly can reduce incidents of pneumonia," she said. "However, not many people take this vaccine." (The updated vaccine for the 2024-25 flu season is now available in hospitals.)

DOCTORS: Doctors must be educated to not use broad-spectrum antibiotics, Dr Walia said. These are antibiotics that work against a wide range of infections, but these are also the ones that are more likely to lead to resistance.

"Our report provides a list of antibiotics that should be used in the community for a particular infection and ones that should be reserved for patients admitted to hospitals," she said.

A survey on prescribing trends for antibiotics released by the National Centre for Disease Control (NCDC) last year found that 71.9% of patients coming to hospitals were prescribed antibiotics on average, with only a 10-percentage point difference in antibiotic use between intensive care units that have the sickest patients and the other wards.

Surprisingly, 55% of the antibiotics were prescribed not for the treatment of an infection, but to prevent one.

Overuse of antibiotics has rendered some of them useless or of limited use. Dr Walia cited the example of the common diarrhoea medicine Norfloxacin, which has become ineffective. Also, resistance to carbapenem, a class of strong, third-line antibiotics used to treat severe bacterial infections, is on the rise for the treatment of conditions such as typhoid, which is not required, she said.

DIAGNOSTICS: Another problem is empirical prescription of antibiotics, made by doctors based on what they think has likely caused the infection based on the symptoms. Instead, doctors should, wherever possible, insist on diagnostic tests that can help them prescribe specific antibiotics for the infection rather than broad-spectrum ones, Dr Walia said.

PHARMA COMPANIES: The WHO's guidelines on antibiotic pollution from manufacturing released last week provides guidance on wastewater and solid waste management for antibiotic manufacturing facilities. Despite the high levels of antibiotic pollution that have been widely documented, the issue is largely unregulated, the WHO said.

"Pharmaceutical waste from antibiotic manufacturing can facilitate the emergence of new drug-resistant bacteria, which can spread globally and threaten our health. Controlling pollution from antibiotic production contributes to keeping these life-saving medicines effective for everyone," Dr Yukiko Nakatani, WHO Assistant Director-General for AMR *ad interim*, said.

What are the most common resistant pathogens in India?

The three most common pathogens isolated in patient samples from tertiary care centres in the ICMR surveillance network are *e. coli*, which can cause gut infections; *Klebsiella pneumoniae*, which can cause pneumonia and urinary tract infections; and *Acinetobacter baumannii*, which is mainly associated with hospital acquired infections, the recent report said.

- *E. coli* isolates demonstrated a decrease in susceptibility to most antibiotics, with susceptibility to carbapenem reducing from 81.4% in 2017 to 62.7% in 2023.
- *Klebsiella pneumoniae* also showed reduced susceptibility, with the susceptibility to two different medicines from the carbapenem class reducing from 58.5% to 35.6% and 48% to 37.6% between 2017 and 2023.
- While no significant change was found in susceptibility for *Acinetobacter baumannii*, its resistance to carbapenems stood at 88% in 2023. Pathogens such as this are highly resistant to even strong antibiotics.

What are some of the most important things that need to be done?

Dr Walia suggested three measures that were likely to have the most impact on antibiotic resistance in the coming years.

PREVENTION of infections by putting in place hygienic practices, improving sanitation, and urging people to get vaccinated.

EDUCATION of doctors to ensure appropriate use of antibiotics, saving the stronger ones for hospital based patients, and getting the patients tested to see which infection they have.

STUDIES to see the pathways of resistance from manufacturing facilities and bring in regulations wherever possible.

Context: Antimicrobial resistance due to the misuse and overuse of antibiotics is a rising concern in India. The question remains: who is accountable, and what actions can be taken to address it.

Antimicrobial Resistance (AMR)

- **About:** It refers to the acquired resistance of microorganisms, such as bacteria, viruses, fungi, parasites etc., to the effectiveness of antimicrobial drugs utilized for infection treatment.
- **Cause**: AMR arises from the evolutionary adaptation of microbes, especially when there is misuse or overuse of antibiotics.
- **Impact of Overuse**: Excessive use of antimicrobial drugs promotes the development of resistant or even extremely resistant strains known as superbugs.
- **Spread of Superbugs**: These superbugs can spread within hospitals, drinking water systems, and through sewers, posing widespread public health risks.
- **Consequences**: Infections caused by resistant pathogens fail to respond to commonly prescribed antibiotics, making them harder to treat and control.

Most Common Resistant Pathogens in India

- **Common Pathogens in India**: The three most commonly isolated resistant pathogens in India are E. coli, Klebsiella pneumoniae, and Acinetobacter baumannii.
- **Decreased Susceptibility of E. coli:** It isolates have shown a significant reduction in antibiotic susceptibility. For instance, susceptibility to carbapenems decreased from 81.4% in 2017 to 62.7% in 2023, indicating growing resistance.
- **Klebsiella pneumoniae Resistance**: It has also exhibited reduced susceptibility to carbapenem antibiotics. Its susceptibility dropped from 58.5% to 35.6% and 48% to 37.6% between 2017 and 2023.
- **Acinetobacter baumannii's High Resistance**: Though Acinetobacter baumannii did not show significant change in susceptibility over the years, its resistance to carbapenems stood at 88% in 2023, making it highly resistant to even powerful antibiotics.

NEW INDIAN EXPRESS Sep 10

MALPE AND MULKI
(Syllabus: GS Paper 3 – Sci and Tech)

Naval might: 2 anti-submarine warfare ships launched at Cochin Shipyard

Context: The Cochin Shipyard Limited (CSL) launched two anti-submarine warfare shallow water crafts which were manufactured here for the Indian Navy.

Malpe and Mulki

- **About:** It is the fourth and fifth ships of the 8 Anti-Submarine Warfare Shallow Water Craft project.
- **Developed by:** Cochin Shipyard Limited (CSL).
- **Part of**: India's 'Aatmanirbhar Bharat' initiative, with over 80% indigenous content.
    - The ships are also a part of the Mahe-class.
- **Features:**
- India's growing self-reliance in defense production and is expected to enhance both domestic manufacturing and employment.
- **Advanced Underwater Sensors:** The newly launched ships, Malpe and Mulki, are equipped with locally developed underwater sensors to detect enemy submarines and underwater threats.
- **Operations**: The vessels are capable of conducting anti-submarine warfare in shallow waters, low-intensity maritime operations, and mine-laying activities.
- **Size and Displacement:** The ships measure 78 meters in length and displace around 900 tons.
- **Speed**: They can achieve speeds of up to 25 knots and have an endurance of 1,800 nautical miles, allowing efficient coverage of vast coastal areas.

YELLOW FOOD DYE

(Syllabus: GS Paper 2/3 – Health/Sci & Tech)

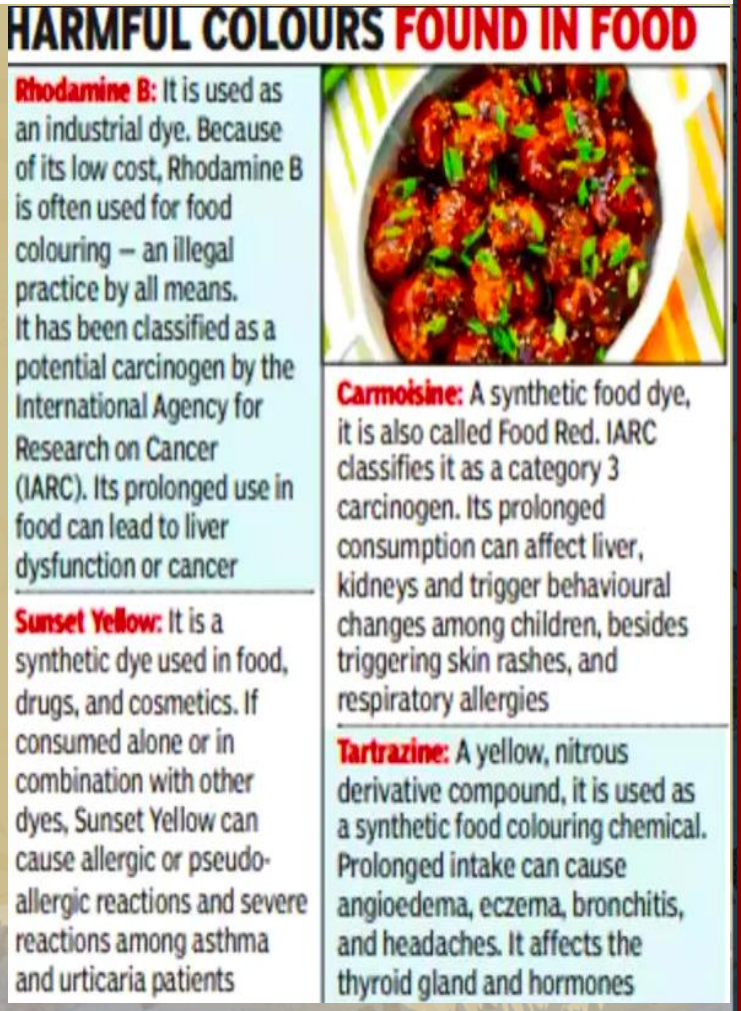
Scientists use common yellow food dye tartrazine to make skin transparent, see internal organs inside body

Context: A recent study has demonstrated that tartrazine, a common food dye, can make the skin of living mice temporarily transparent.

- This innovative technique allows scientists to observe internal organs without invasive procedures.

Yellow Food Dye

- **About:** It is a synthetic lemon yellow azo dye primarily used as a food coloring.
- **Also known as**: Tartrazine
- **Physical Properties**: It has a lemon yellow color and is water-soluble.
- **Mechanism:**
  - **Refractive Index Matching**: The transparency is achieved by aligning the refractive indices of tissues using a tartrazine solution, reducing light scattering and making the skin transparent.
  - **Light Interaction:** Tartrazine absorbs specific wavelengths, especially red light, altering how light interacts with the tissue to reveal internal structures like blood vessels and muscles.
  - **Real-Time Visibility**: This method allows real-time visualization of internal organs and muscle contractions, aiding in research and medical observations.
  - **Reversibility of Effect:** The transparency effect is reversible, and rinsing off the dye restores the skin's original appearance without permanent changes.
- **Potential Applications:**
  - This technique could simplify blood draws, improve laser tattoo removal, and aid in early cancer detection.
  - This innovation could assist in the early detection of skin cancer and make veins more visible.



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