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CIVIL SERVICES ACHIEVERS' POINT

A ONE STOP SOLUTION FOR UPSC/APSC/SSC & BANKING

THE ASSAM TRIBUNE ANALYSIS

DATE - 20th APRIL 2021

For Preliminary and Mains examination

As per new Pattern of APSC

(Also useful for UPSC and other State level government examinations)

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Leadership through knowledge...

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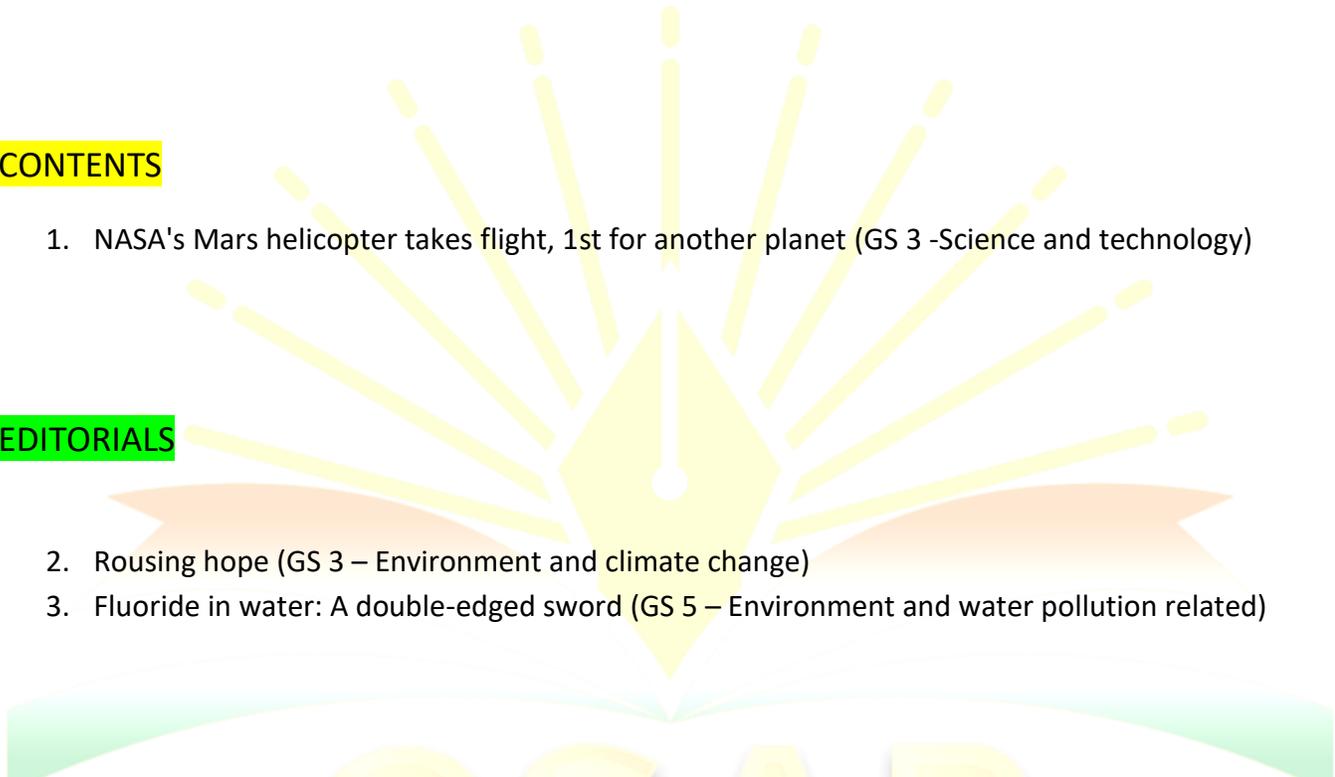
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NASA's Mars helicopter takes flight, 1st for another planet

- NASA's experimental helicopter Ingenuity rose into the thin air above the dusty red surface of Mars on Monday, achieving the first powered flight by an aircraft on another planet.
- The triumph was hailed as a Wright Brothers moment. The mini 4-pound (1.8-kilogramme) copter even carried a bit of wing fabric from the 1903 Wright Flyer, which made similar history at Kitty Hawk, North Carolina.
- "Altimeter data confirms that Ingenuity has performed its first flight, the first flight of a powered aircraft on another planet," said the helicopter's chief pilot back on Earth, Harvard Grip, his voice breaking as his teammates erupted in applause.
- It was a brief hop just 39 seconds" but accomplished all the major milestones.
- Project manager MiMi Aung was jubilant as she ripped up the papers holding the plan in case the flight had failed.
- "We've been talking so long about our Wright Brothers moment, and here it is," she said. Flight controllers at NASA's Jet Propulsion Laboratory in California declared success after receiving the data and images via the Perseverance rover, which we've been talking so long about our Wright Brothers moment, and here it is... Each world gets only one first flight — MiMi Aung stood watch more than 200 feet (65 metres) away. Ingenuity hitched a ride to Mars on Perseverance, clinging to the rover's belly upon their arrival in an ancient river delta in February.
- The USD 85-million helicopter demo was considered high risk, yet high reward. "Each world gets only one first flight," Aung observed earlier this month. Ground controllers had to wait more than three excruciating hours before learning whether the pre-programmed flight had succeeded more than 170-million miles (287-million kilometres) away.
- Adding to their anxiety: A software error prevented the helicopter from lifting off a week earlier and had engineers scrambling to come up with a fix. When the news finally came, the operations centre filled with applause, cheers and laughter.

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- More followed when the first black and white photo from Ingenuity appeared on the Mission Control screens, showing the helicopter's shadow as it hovered above the surface of Mars. Next came the stunning colour images of the copter descending back to the surface, taken by Perseverance, "the best host little Ingenuity could ever hope for," Aung said in thanking everyone.
- The helicopter achieved its planned altitude of 10 feet (3 metres), according to the altimeter data, and hovered for a full 30 seconds, appearing stable. The touchdown looked just as clean. More details were expected in the coming hours and days.
- To accomplish all this, the helicopter's twin, counter-rotating rotor blades needed to spin at revolutions per minute five times faster than on Earth. With an atmosphere just 1 per cent the thickness of Earth's, engineers had to build a helicopter light enough -- with blades spinning fast enough -- to generate this otherworldly lift. At the same time, it had to be sturdy enough to withstand the Martian wind and extreme cold.
- More than six years in the making, Ingenuity is a barebones 19 inches (49 centimetres) tall, a spindly four-legged chopper. Its fuselage, containing all the batteries, heaters and sensors, is the size of a tissue box. The carbon-fibre, foam-filled rotors are the biggest pieces: Each pair stretches 4 feet (1.2 metres) tip to tip. The helicopter is topped with a solar panel for recharging the batteries, crucial for its survival during the minus-130 degree Fahrenheit (minus-90 degree-Celsius) Martian nights.
- NASA chose a flat, relatively rock free patch for Ingenuity's airfield, measuring 33 feet by 33 feet (10 metres by 10 metres). It turned out to be less than 100 feet (30 metres) from the original landing site in Jezero Crater.
- The helicopter was released from the rover onto the airfield on April 3.
- Flight commands were sent on Sunday, after controllers sent up a software correction for the rotor blade spin-up.
- Following Monday's success, NASA named the Martian airfield: "Wright Brothers Field." "While these two iconic moments in aviation history may be separated by time and 173-million miles of space, they now will forever be linked," NASA's science missions chief Tomas Zurbuchen announced.

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Rousing hope

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- For quite a few decades scientists have been blaming the rising temperatures which Planet Earth is experiencing on global warming and climate change, and warning that unless these are reversed, the

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problem would grow more severe in future. Indications of rising temperature are visible everywhere and with increasing frequency.

- Wildfires have ravaged many regions of the world, including the Amazon rain forests; coastal areas are witnessing typhoons, tornadoes and cyclones of greater force and damaging potential; ice encrusted areas in the Polar Regions are shrinking in size while glaciers are melting with astonishing rapidity, providing irrefutable evidence of global warming.
- After squabbling for years in slug-fests masquerading as "climate summits", finally, in 2015, at the Paris Agreement, the world finally hammered out a strategy to limit global warming to two degree Celsius below pre-industrial levels and to try and limit the increase to 1.5 degree Celsius.
- Participating nations conceded that reduction of carbon footprints, the main factor for global warming, can be achieved only through decrease in the use of fossil fuels and more reliance on green, non-polluting energy, and agreed to carry out programmes designed to achieve that objective.
- Yet, having signed that "historic" Accord, humanity appears to be in no hurry to implement its provisions. For instance, the promise of financial help by developed nations to developing ones to implement green energy measures has not yet quite materialized.
- With the urgently required thrust at generating renewable energy after harnessing power of the wind, sun, water, nuclear plants, etc., not being evident at the desired level, it would not be an overstatement to say that six years on, the world is no nearer to the goal set in the Paris Accord.
- The main roadblock has been the reality that self-interest always guides the actions of nations which makes them miss the wood for the trees. For example, Donald Trump had pulled the US, the biggest environmental polluter in the world, out of the Paris Accord, and began the coal industry to create jobs.
- It is in such a context that the recent meetings between Chinese climate envoy Xie Zhenhua and his US counterpart John Kerry in Shanghai has roused such hopes in a decidedly bleak environmental scenario. A joint statement issued by the two leaders stated that the US and China were committed to cooperating with each other and with other countries to tackle the climate crisis, which must be addressed with the seriousness and urgency that it demands.
- They also agreed on further specific actions to reduce emissions, and China also confirmed it would participate in the virtual climate summit which US President Joe Biden is holding. If, indeed, these two adversarial nations bury the hatchet and work together on tackling global warming and climate change, it might be a game-changer for our beleaguered planet.

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Fluoride in water: A double-edged sword

- Fluoride is essential for our teeth and bone health, and so most municipalities across the world add some amount of fluoride to their piped water. However, excessive intake of fluoride leads to fluorosis of teeth and fluoride is a developmental neurotoxin and has adverse cognitive and endocrine effects.
- The most vulnerable are the children below the age of eight.
- Dental fluorosis due to excessive fluoride is characterized by intrinsic discolouration of our teeth. Severe fluorosis makes weak and causes physical damage. Long-term fluoride ingestion leads to skeletal fluorosis starting with stiffness and pain of the joints and culminating in the deformation of bones.
- The bones become weaker as they get hard and less elastic. Cases of twisted limbs and stunted growth are common in fluoride affected areas. Fluoride causes hormonal changes leading to calcium leaching out from the bones, making them very fragile.
- Fluoride is suspected to destroy the intestinal lining affecting nutrient (iron) .
- It kills the gut bacteria responsible for vitamin B12 synthesis needed for haemoglobin production.
- Fluoride also leads to a reduction in red blood cell (RBC) formation.
- Fluoride also affects animals including the domestic cattle population. Such impact may be devastating for our agricultural economy where cattle play a major role.
- Fluoride is mainly released into groundwater via slow dissolution of fluoride-bearing minerals present in the earth's crust. The Bureau of Indian Standards (BIS) has set a limit of 1 milligram litre (mg/L) of fluoride in drinking water. If one teaspoon of sugar (4 g) is divided into 4(") equal then each litre will be 1 mg. More than one part in one litre of water is toxic!
- About 260 million people in 25 countries are affected by fluoride with 70 million in 20 States of India. One-third of India's villages have a fluoride problem. Assam first reported of fluorosis in Tekelanguin village in Kalbi Anglong in 1999 with children having mottled teeth and some exhibiting skeletal fluorosis.
- Today, at least 20 districts in Assam are affected. The short Tale of Tapatjuri gives a glimpse of the fluoride problem in Assam. Even Guwahati is facing a major fluoride problem if we continue to pump out groundwater. *Leadership through knowledge...*
- Nalgonda (in present-day Telangana) was the first to report the fluoride problem in India back in I(J.37. 'Illey used the Nalgonda Technique with lime (stone), alum (an aluminium compound), and bleaching powder to treat their water. Other aluminum based adsorbents are also used elsewhere.

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- However, aluminum and its fluoride complexes (aluminumfluorides) are known neurotoxins and should be ion-exchange and reverse osmosis (RO) work well. However, with the majority of people affected by fluoride from rural and remote communities, there is a need to develop people-friendly defluoridation techniques (maybe adsorption).
- We have our own success stories in Assam. Prof. Robin Dutta from Tezpur University has developed a do-it-yourself fluoride removal process. His fluoride Nilogon process needs limestone, sand, and phosphoric acid.
- Our engineering and science colleges and universities need to step up. Our institutions should meet the needs of the land. We can contribute through outreach (help to the communities to set up drinking water systems), and education.
- We help the communities form their own self-help groups and water management committees emulating the Kothora (Nalbari) community water project example. can make people aware of the government's Jal Jeevan Mission and other programmes, and help them prepare projects working alongside local public health engineers.
- We can help start a project under the government schemes and the community takes over from there like in Kothora. All institutions of higher education have a moral obligation to help the people of the region. It is the time!
- Unlike arsenic we need fluoride management in a multi-disciplinary approach. Lack of fluoride in drinking water leads to but an excess of it leads to fluorosis -- a double-edged sword indeed. It is more a risk mitigation operation. We need more than just water treatment. Nalgonda's fluoride problem is waning out because of the aggressive water treatment and emphasis on human nutritional needs.
- In Akashiganga Gaon Panchayat (Hojai) a multi-pronged approach was adopted under the leadership of public health ex-chief engineer AB Paul. A NGO, Environment Conservation Centre, also worked on the problem. In addition to giving access to fluoride-free water, there were medical interventions.
- Young Tarun's twisted limbs became very much normal after about 4 years of treatment, and Nurjahan saw positive effects within a year of starting treatment (names changed for privacy). There are similar success stories from Rajasthan which is a fluoride hotspot, and they have even developed a vitamin-infused chutney for people who are anti-medicine.
- Major medical interventions among children include supplements of calcium, vitamins C and D, magnesium, and zinc. Proteins and high energy food are also important.
- The New treatment paradigm includes methionine, carnosine, and vitamin E supplements. Methionine is an amino acid found in meat, fish, and dairy products. Carnosine is found in animal proteins. Our

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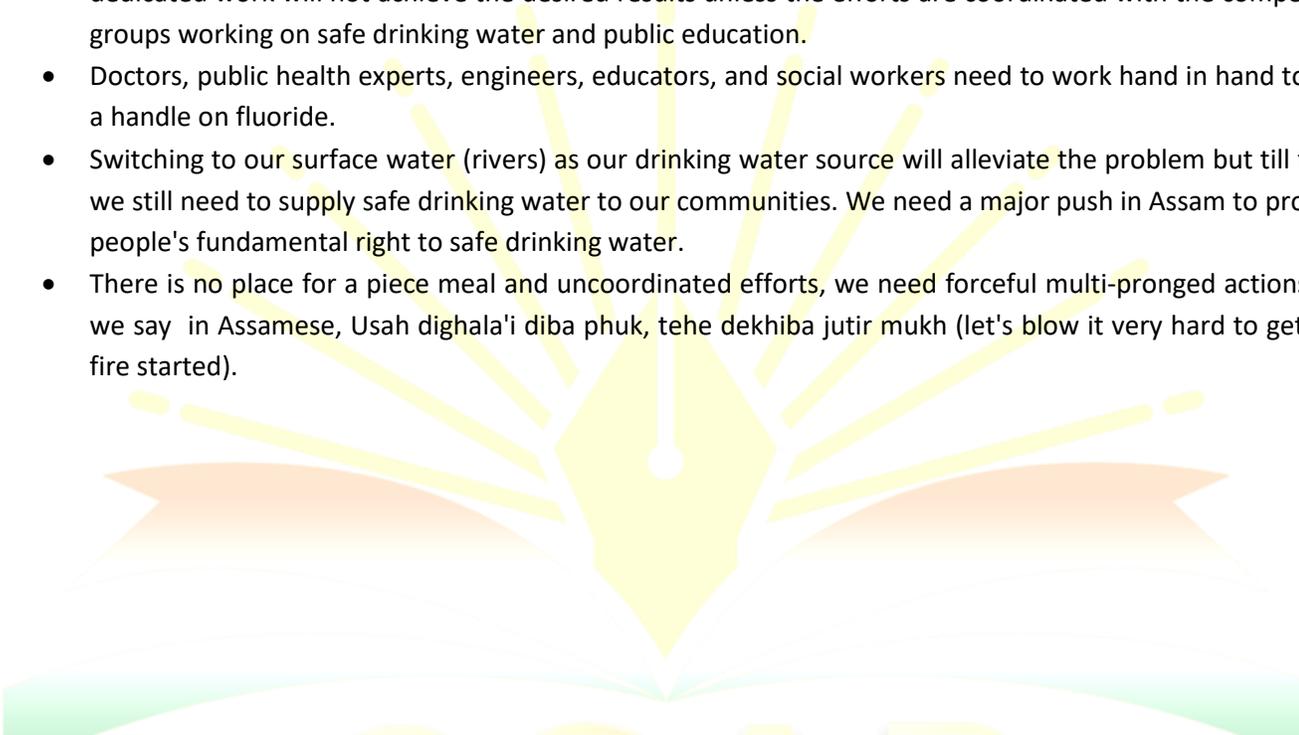
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traditional drumstick (sozina) leaves, plum fruits (kola jamu), tamarind (teteli), nettle seeds (chorat guti), and amla (amlokhi) also have preventive and curative properties.

- The National Health Mission in Assam has started working on medical interventions. However, their dedicated work will not achieve the desired results unless the efforts are coordinated with the competent groups working on safe drinking water and public education.
- Doctors, public health experts, engineers, educators, and social workers need to work hand in hand to get a handle on fluoride.
- Switching to our surface water (rivers) as our drinking water source will alleviate the problem but till then we still need to supply safe drinking water to our communities. We need a major push in Assam to protect people's fundamental right to safe drinking water.
- There is no place for a piece meal and uncoordinated efforts, we need forceful multi-pronged actions. As we say in Assamese, Usah dighala'i diba phuk, tehe dekhiba jutir mukh (let's blow it very hard to get the fire started).



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