



VEDHIK

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FOREWORD

We, at Team Vedhik is happy to introduce a new initiative - "Daily Current Affairs_The Hindu" compilations to help you with UPSC Civil Services Examination preparation. We believe this initiative - "Daily Current Affairs_The Hindu" would help students, especially beginners save time and streamline their preparations with regard to Current Affairs. A content page and an Appendix has been added segregating and mapping the content to the syllabus.

It is an appreciable efforts by Vedhik IAS Academy helping aspirants of UPSC Civil Services Examinations. I would like to express my sincere gratitude to Dr. Babu Sebastian, former VC - MG University in extending all support to this endeavour. Finally I also extend my thanks to thank Ms. Shilpa Sasidharan and Mr. Shahul Hameed for their assistance in the preparing the compilations.

We welcome your valuable comments so that further improvement may be made in the forthcoming material. We look forward to feedback, comments and suggestions on how to improve and add value for students. Every care has been taken to avoid typing errors and if any reader comes across any such error, the authors shall feel obliged if they are informed at their Email ID.

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A lot is at stake for India-Bangladesh ties

While they have deepened ties, the Hasina and Modi governments have failed to resolve long-standing issues



SYED MUNIR KHASRU

In August, while addressing devotees gathered to celebrate Janmashtami, Bangladesh Foreign Minister Abdul Momen requested the Indian government to ensure that Prime Minister Sheikh Hasina stays in power when Bangladesh goes to the polls next year. He claimed that both India and Bangladesh would gain political stability by ensuring this. These out-of-the-norm comments from the senior cabinet member created a stir on both sides of the border. Senior leaders of the ruling Awami League distanced themselves from these remarks, while India maintained silence. Mr. Momen's comments came before Ms. Hasina's visit to India from September 5 to 8, 2022.

Trade and connectivity

Following the conclusion of the seventh round of the India-Bangladesh Joint Consultative Commission in June, the two neighbours have expanded their partnership to include Artificial Intelligence, Fintech, cybersecurity, startups, and connectivity. Trade will be a focal point during Ms. Hasina's visit as the two countries gear up to sign a Comprehensive Economic Partnership Agreement (CEPA). The two Prime Ministers are also expected to inaugurate a joint venture power plant soon.

CEPA comes at a time when Bangladesh is set to lose the duty-free and quota-free market-access facility to India after 2026 when it graduates to a developing country. Bangladesh is India's sixth largest trade partner with bilateral trade rising from \$2.4 billion in 2009 to \$10.8 billion in 2020-21. Bangladesh imports critical industrial raw material from India on which its exports are reliant. According to a World Bank working paper, Bangladesh's exports could rise 182% under a free trade agreement. This could become 300% if combined with trade facilitation measures and reduced transaction costs. Bangladesh also could improve several manufacturing industries by leveraging Indian expertise in service sectors.

India and Bangladesh have implemented several projects to boost



PTI

eastern India-Bangladesh connectivity. India's connectivity projects with ASEAN and Bangladesh will open up the region to economic growth. Bangladesh has expressed its interest in joining the India-Myanmar-Thailand highway project. India-Bangladesh bilateral waterway trade will get boosted as India can now use the Mongla and Chittagong ports. India is rallying Bangladesh to divert its exports through Indian ports in place of Malaysian or Singaporean ports. Enhancing connectivity through India's Northeast and Bangladesh is important for bilateral cooperation. Currently, three express trains and international bus services operate between Indian and Bangladesh.

The sharing of the waters of the Teesta has remained a thorny issue between the two countries since 1947. For West Bengal, Teesta is important to sustain its impoverished farming districts which comprise 12.77% of its population. For Bangladesh, the Teesta's flood plains cover about 14% of the total cropped area of the country and provide direct livelihood opportunities to approximately 7.3% of the population. The countries are expected to sign at least one major river agreement during the upcoming trip.

In 2015, India and Bangladesh resolved the decades-long border dispute through the Land Swap Agreement. Indian Home Minister Amit Shah recently reviewed the security arrangements in the Assam-Meghalaya-Bangladesh tri-junction, which used to a smugglers' route. In 2019, India enacted the National Register of Citizens and the Citizenship

(Amendment) Act, which created an uproar within and beyond the borders. Ms. Hasina termed the move as "unnecessary". But her government has mostly kept silent on India's "internal matter" even as political commentators and citizens have feared it could have ripple effects for Bangladesh. The detainees caught at the border that year claimed they were Bangladeshi citizens who were returning to the country on failing to obtain Indian citizenship.

Regional geopolitics

Chinese inroads into the neighborhood have been a cause of worry for India. China has been actively pursuing bilateral ties with Bangladesh. Bangladesh had successfully approached China for a mega project to enhance Teesta river water flow. Bangladesh also requires China's support in resolving the Rohingya refugee crisis. Bangladesh is the second biggest arms market for China after Pakistan.

Bangladesh has also been warming up to Pakistan. The two shared frosty ties for decades after Pakistani politicians made unwarranted comments on the International Crimes Tribunal set up by Bangladesh. Although memories of 1971 remain, Bangladesh has expressed its interest in establishing peaceful relations with Pakistan.

In its election manifesto for the 2018 Bangladesh general elections, the ruling Awami League emphasised cooperation with India, including in sharing Teesta waters. Teesta remains a concern for the Bangladeshi population which is dependent on the river for their livelihood. Ms.

Hasina has worked on strengthening bilateral ties and has uprooted all anti-India insurgency activities within Bangladesh by leading from the front. But the unresolved Teesta issue does not put her in good standing with the electorate. Many believe that her bold and pragmatic steps in strengthening relations with India have not been adequately reciprocated by Delhi and Kolkata.

India-Bangladesh ties witnessed the lowest ebb during the 2001-2006 tenure of the Bangladesh Nationalist Party (BNP). In 2004, a 10-truck arms and ammunition haul took place in Chittagong. Investigators believed that the delivery of the smuggled arms was intended for the United Liberation Front of Asom, a militant group seeking Assam's independence from India. These illicit activities created tensions between the countries. The BNP's short-sighted and unwise handling of relations with India cost it dearly, for Delhi's corridors of power lost confidence in the party. But by openly flouting its warm relations with India as a safeguard for continuity of power, the Awami League is not playing smart with the electorate either.

In Bangladesh, there is a prevailing perception that India's goodwill towards the country is aligned to one particular political ideology or school of thought as opposed to Bangladeshi society at large. For India, the challenge is to earn the trust and confidence of Bangladeshis across the spectrum and strata. Ms. Hasina has deepened ties with the Narendra Modi government, but the two have failed to resolve long-standing issues such as Teesta water-sharing and killings at the border. The question is, how these factors may affect elections in Bangladesh. For India it will take more than cosy relations with one particular government to have long-term stable relations with its most trusted friend in the neighbourhood. Just as Bangladeshis remain grateful to India for the generous support extended by India during the Liberation War of 1971, they are equally sensitive to being treated with respect and fairness, no matter who rules their country.

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Hasina's visit to focus on water sharing

The Bangladesh PM is also expected to aim at energy cooperation and uninterrupted commerce

KALLOL BHATTACHERJEE
NEW DELHI

Bangladesh Prime Minister Sheikh Hasina's September 5-8 India visit is expected to focus on issues that can help her counter negative factors ahead of the election scheduled next year, *The Hindu* has learnt from sources working on the agenda of the visit. Apart from engaging Prime Minister Narendra Modi in a political dialogue, the visiting leader is likely to focus on water sharing, energy cooperation, uninterrupted commercial flow and greater connectivity.

"We are sensing that there will be an energy supply element in bilateral agreements between the two sides," said a diplomatic source without getting into the specifics. One of the hallmarks of Ms. Hasina's 13-year-old govern-



Cementing ties: Narendra Modi and Sheikh Hasina during the inauguration of various projects in Bangladesh in 2021. ■PTI

ment has been the stability of energy and power generation in Bangladesh which has drastically reduced load shedding in major cities and industrial areas and ports.

However, since last month

Bangladesh has seen more than a 50% hike in energy which has contributed to increased price of essential supplies, creating a challenging situation for her government. A source also hinted

that even in the absence of an energy agreement, there is likely to be a "favourable response" from India if Bangladesh was to seek suggestions from the Indian side about how to address the current energy crisis.

Ahead of her visit, Ms. Hasina reached out to the political leadership praising the assistance that Bangladesh received from India during the COVID-19 pandemic.

Ms. Hasina's government has been consistent in expressing concern about disruption in the supplies of certain essential commodities for which Bangladesh depends on India.

Regional friendship

Ms. Hasina's stay is expected to include a visit to the famed Sufi shrine at Nizamuddin here as well as a trip

to Ajmer Sharif in Rajasthan.

The discussion between the two sides will provide India a window to assess the political might and legacy of Sheikh Hasina who first became Prime Minister in 1996 and dealt with Prime Ministers Atal Bihari Vajpayee, Inder Kumar Gujral and H.D. Deve Gowda. Her next stint at power began in 2009 and has continued uninterrupted till now.

The dominance of the Awami League in Bangladesh and allegations of human rights violation against her government have drawn negative attention from the western powers. However, the visit to India will provide Ms. Hasina an opportunity to showcase her regional friendship ahead of her expected trips to the western destinations later this year.

EXPLAINER

The International Monetary Fund's staff-level agreement with Sri Lanka

What are the pre-requisites IMF laid down before the Sri Lankan government? How has India reacted to the agreement?

MEERA SRINIVASAN

The story so far: The International Monetary Fund (IMF) on September 1 announced a staff-level agreement with Sri Lanka, months after the island nation's economic crisis intensified this year, following a serious Balance of Payments problem.

What is the staff-level agreement? It is a formal arrangement by which IMF staff and Sri Lankan authorities agree on a \$2.9-billion package that will support Sri Lanka's economic policies with a 48-month arrangement under the Extended Fund Facility (EFF).

However, even though the IMF has agreed to support Sri Lanka, the EFF is conditional on many factors. Sri Lanka must take a series of immediate measures that the Fund has deemed necessary to fix fiscal lapses and structural weaknesses – such as raising fiscal revenue, safeguarding financial stability and reducing corruption vulnerabilities. Apart from making domestic policy changes to strengthen the economy, Sri Lanka must also restructure its debt with its multiple lenders. The IMF has said that it will provide financial support to Sri Lanka only after the country's official

creditors give financing assurances on debt sustainability, and when the government reaches a collaborative agreement with its private creditors. The process could take several months.

What next?

Sri Lanka has already taken some significant policy measures. Beginning this year, the Central Bank has floated the rupee, raised interest rates sharply, increased electricity tariffs and fuel prices and restored tax cuts introduced during President Gotabaya's time in office. While the government embarks on a path of fiscal consolidation, it has the difficult task of negotiating with a diverse group of creditors, including International Sovereign Bond (ISB) holders, to whom the island owes nearly half of its foreign debt, multilateral-lateral agencies, and foreign governments, mainly China, Japan, and India. While talks with the ISB holders are likely to be legal and technical, discussion with bilateral creditors is a more complex exercise, with geopolitical dimensions.

What have the countries said?

China has signalled its willingness to lend more money to the country but has put the onus of restructuring past debt on Sri



Sri Lankan President Ranil Wickremesinghe meeting with IMF staff on September 1. •AFP

Lanka. "We hope Sri Lanka will work actively with China in a similar spirit and work out a feasible solution expeditiously," the Chinese Embassy said after the government firmed up the staff-level agreement with the IMF.

Japan has pledged to work with Sri Lanka and other creditors, but underscored that it is important for Sri Lanka, in collaboration with the IMF and Paris Club, "to work for the betterment of its economic and fiscal situation while securing transparency." India, too, backs the IMF process and will likely cooperate, although New Delhi has said it is still studying the "evolving, unfolding" story of the IMF agreement. Ministry of

External Affairs spokesman Arindam Bagchi said: "India has been advocating for assistance to Sri Lanka but let us see how it progresses. Issues of creditor equitability and transparency are important." This means that India expects Sri Lanka to treat all its creditors equally and fairly. The statement comes amid speculation on whether Colombo might accord preferential treatment to one partner.

The IMF has indicated that creditors also have a role to play in ensuring Sri Lanka's crisis does not deepen.

Is the \$2.9-billion a bailout package?

The \$2.9 billion agreed upon by both sides, is short of Sri Lanka's expectations of support totalling \$3 to \$4 billion. In any case, even if the IMF package arrives swiftly, subject to Sri Lanka's success with the "prior actions" spelt out by the Fund, it cannot "bailout" Sri Lanka.

After a pre-emptive sovereign default in April – the island's foreign debt totals \$51 billion – Sri Lanka is still grappling with its Balance of Payments crisis. The government has resorted to wide import restrictions, while exports remain limited to the country's traditional basket of tea, garments, and spices.

From the ordinary citizen's point of

view, cost of living is soaring. Headline inflation went up to 64.3% in August 2022, and food inflation increased to 93.7%. The World Food Programme estimated that about 30% of Sri Lanka's population, became food insecure, since the crisis worsened this year. Many families, especially those belonging to the working population, are starving.

How then can the IMF package help?

If it comes through, the IMF package will effectively make Sri Lanka credit-worthy again, allowing the government to borrow once again from private creditors, multilateral lenders and bilateral partners. While many see the programme as necessary, few think it will be sufficient for substantive economic recovery. They believe it would push the government to make necessary policy shifts to ensure higher revenue and lesser state spending and address the problem of corruption.

The responsibility of building fiscal strength and resilience is, however, Sri Lanka's. For that, the government must also introspect on its heavy reliance on imports, the status of domestic production, prospects for boosting exports with greater value addition, and ways to address income and wealth inequality.

THE GIST

■ The IMF on September 1 announced a staff-level agreement with Sri Lanka, months after the island nation's economic crisis intensified this year.

■ The IMF's External Fund Facility is conditional on many factors. Sri Lanka must take a series of immediate measures to fix fiscal lapses and structural weaknesses – such as raising fiscal revenue, safeguarding financial stability and reducing corruption vulnerabilities.

■ The IMF package will make Sri Lanka credit-worthy again, allowing the government to borrow once again.

Perils of brinksmanship

India will need to assess the security implications of another Taiwan Strait crisis

The shooting down of a Chinese drone by Taiwan's military on September 1 has marked a new phase in the already simmering tensions across the Taiwan Strait, highlighting the growing risks of escalation, even if unintended. Over recent weeks, China's military has carried out unprecedented military drills surrounding Taiwan, following the visit last month of U.S. House Speaker Nancy Pelosi. Some manoeuvres crossed the median of the Taiwan Strait and were declared by China's military to have also taken place in territorial waters claimed by Taiwan. Taiwan soberly chose not to engage the PLA vessels. In the wake of the drills, the Chinese military has subsequently sought to continue asserting Beijing's territorial claims by sending drones into Taiwan's airspace. Photographs taken up close of Taiwan military personnel were subsequently shared on social media, apparently to demonstrate Beijing's capabilities, but in the process raising pressure on Taipei to show a response. Taiwan's military said it took the decision to shoot down what it called an unidentified civilian drone over its airspace in Shiyu Island after delivering several warnings. Shooting down a military drone may have elicited a different response from China, which has so far played down the incident. While the Chinese military reportedly has been deploying both military and civilian-use drones, so have ordinary residents in Fujian right across the strait, raising the risks of miscalculation triggering a serious incident.

The deployment of drones has added a further layer of unpredictability to an already tense situation. The past month's developments have certainly served a reminder to the region of the fragility of the current status quo, and particularly of China's willingness to change it. While most observers expect that a Chinese invasion remains too risky a prospect for the Communist Party leadership in the immediate future, an unintended escalation no longer remains a remote possibility. Most countries, including India, have preferred to stay out of the Taiwan issue, considering the One China Policy and the needs of the complicated relations with China. But sooner rather than later, they will need to assess the implications to their own security interests of a serious crisis. Taiwan's status as a lynchpin in the global semiconductor industry is a case in point. While India's recent reference to the "militarisation" of the strait is not a reflection of a major change in its approach, New Delhi has appeared to show greater willingness to do more with Taiwan particularly in the economic realm, such as setting up an alternative base for semiconductor manufacturing in India. These are, even if long overdue, steps in the right direction.

Changing the age of consent

Older adolescents engaging in consensual and non-exploitative acts find themselves embroiled in the criminal justice system



SWAGATA RAHA
& SHRUTHI RAMAKRISHNAN

In August 2, in *Rama @ Bande Rama v. State of Karnataka*, the Karnataka High Court quashed criminal proceedings of rape and kidnapping under the Indian Penal Code, and penetrative and aggravated penetrative sexual assault under the Protection of Children from Sexual Offences (POCSO) Act, 2012, which had been initiated based on a complaint of a 17-year-old girl's father against her 20-year-old partner. The girl stated in court that the acts were consensual and she had married the accused after she had turned 18. The marriage was registered and a child was born to the couple. The High Court observed that "if the court would shut its doors to the couple who are married and bringing up the child, the entire proceedings would result in miscarriage of justice."

Normalcy of relationships

With the enactment of POCSO, a number of young couples in consensual and non-exploitative relationships have found themselves embroiled in the criminal justice system. Since consent of a "child" is immaterial, consensual sexual intercourse with or among adolescents is treated on a par with rape. While boys/young men are charged with sexual offences, the girls are treated as victims and institutionalised in children's homes when they refuse to return to their parents or their parents refuse to accept them. Faced with criminal prosecution and incarceration, the only relief available to the couple is to urge the High Court to quash the case by using its inherent power under Section 482 of the Criminal Procedure Code, "to prevent abuse of the process of any Court or otherwise to secure the ends of justice."

Several other High Courts too have recognised the normalcy of these relationships, the futility of prosecuting romantic cases owing to the consensual nature of the relationships and marriage between the parties, as well as the harmful impact of continued prosecution on both parties. While quashing a similar case in *Vijaylakshmi v. State Rep* (2021), the Madras High Court observed that, "[p]unishing an adolescent boy who enters into a relationship with a minor girl by treating him as an offender, was never the objective of the POCSO Act." In *Raj Kumar v. State of Himachal Pradesh* (2021), the Himachal Pradesh High Court allowed a petition filed by the minor girl's father for quashing

the trial against his son-in-law. It observed: "If criminal proceedings are allowed to continue, the same will adversely affect the married life of his daughter..." In *Skhemborlang Suting v. State of Meghalaya* (2021), a couple got entangled under the POCSO Act when the husband took his wife, who was 17, to a hospital for a check-up after she became pregnant. The Meghalaya High Court quashed the case observing that an application of the Act would "result in the breakdown of a happy family relationship and the possible consequence of the wife having to take care of a baby with no support..."

An analysis by Enfold Proactive Health Trust of 1,715 "romantic" cases under the POCSO Act decided between 2016-2020 by Special Courts in Assam, Maharashtra, and West Bengal revealed that such cases constituted 24.3% of the total cases decided by the courts. The parents and relatives of the girls constituted 80.2% of the complainants. They approached the police after the girl went "missing", or eloped with her partner, or a pregnancy was discovered. The victim and the accused were married to each other in only 46.5% of the cases. In 85.5% of the cases, the girls said the relationship was consensual. In 81.5% of the cases, they did not state anything incriminating against the accused during evidence. In 61.7% of the cases, the Special Courts too acknowledged that the relationship was consensual. Moreover, acquittals were recorded in 93.8% of the cases.

Law reform

The high rate of acquittals shows that the law is not in sync with social realities of adolescent relationships. The High Courts have also acknowledged the disruptive impact of the criminal law in such cases. While the marriage between the parties appears to have influenced several High Courts and resulted in the quashing of romantic cases under the POCSO Act, sexual behaviour is normative during adolescence, and not all relationships end in marriage. Blanket criminalisation of such consensual sexual acts involving older adolescents erodes their dignity, best interests, liberty, privacy, evolving autonomy, and development potential. It also impacts the delivery of justice as these cases constitute a large burden on our courts, and divert attention from investigation and prosecution of actual cases of child sexual abuse and exploitation. There is thus a compelling need for law reform to revise the age of consent and prevent the criminalisation of older adolescents engaging in factually consensual and non-exploitative acts.

Swagata Raha and Shruthi Ramakrishnan are with the Research Team at Enfold Proactive Health Trust, Bengaluru

India and Australia, from divergence to convergence

The fifth round of the bilateral Track 1.5 dialogue will set the pace for Canberra's deepening relationship with New Delhi



AMITABH MATTOO & LISA SINGH

In August 1950, one of Australia's most celebrated jurists, Sir Owen Dixon (who sought to mediate a settlement on Kashmir) wrote to his daughter, Anne, in Melbourne that Delhi was "a place I hope and trust that I shall never again see". More than 70 years later, as distinguished thought leaders from India and Australia meet in New Delhi (September 6) for the fifth round of the most important bilateral Track 1.5 dialogue, it is widely recognised that Canberra's relationship with New Delhi is among the most important and critical for the future of the Indo-Pacific. The leaders at the dialogue will reflect on the past, but recommend more concrete steps to foster the relationship and ways to create a more habitable and sustainable planet.

A gradual change

When we started this dialogue we recognised that for most of the 20th century, India and Australia rarely had a meaningful conversation. The long shadow of the Cold War, India's autarkic economic policies, the White Australia policy, and Canberra's decision not to transfer uranium to India and oth-

er factors had kept the two countries apart for several decades. We used to celebrate each other's problems rather than our successes. But that era of mutual schadenfreude is well and truly over.

Today, few countries in the Indo-Pacific region have more in common in both values and interests than India and Australia. Apart from being two English-speaking, multicultural, federal democracies that believe in and respect the rule of law, both have a strategic interest in ensuring a balance in the Indo-Pacific and in ensuring that the region is not dominated by any one hegemonic power. In addition, Indians are today the largest source of skilled migrants in Australia and the economic relationship, already robust, could potentially be transformed if the promise of the new Australia-India Economic Cooperation and Trade Agreement (ECTA) is realised.

Setting markers for ties

A dialogue is a conversation between equals who have agreed to work as partners. No one just preaches, no one just listens. Thought leaders have come here, some from long distances, to have a robust conversation about our relationship and ways in which we can carry it forward. We are here also to lead and provide markers for the future of the relationship between our two great countries.

We are living through a period of immense turbulence, disrupt-

GETTY IMAGES/ISTOCKPHOTO



tion and even subversion: the world is more uncertain than it ever was in our lifetimes. Even the Cold War, some may say, had a predictability, icy as it may have been.

The Australia-India Leadership Dialogue is critical because ideas matter in a relationship as much transactions and negotiations do. Stable, strong and sustainable relationships are built not just on the possibility of immediate gains, but on the promise of the future. In other words, the relationship is far too important to be left to the two governments alone. Governments matter tremendously, but forums such as these can provide the space and the ambience that can infuse new ideas to generate a new energy into the relationship.

Seeds that will germinate

The Leadership Dialogue is also important because ultimately, people and real connections matter. Technology and the cyberworld can blind us into believing that face-to-face conversations are outdated. We, in this Leadership Dialogue, still believe in the power of

personal communication and collective communication in a shared physical space.

In her definitive account of India-Australia bilateral relations, historian Meg Gurry relates how Arthur Tange, High Commissioner to India and one of Australia's most formidable diplomats, wrote in 1965 to his Foreign Minister, Paul Hasluck, that there was fertile ground between the two countries, but "no one seems to know what seeds to plant". Nearly 60 years on, there are not only many seeds waiting to be planted, but much ripe fruit ready to harvest. And that is why we are here.

Some of those seeds will germinate during this important dialogue through discussion, from a broad range of business executives, government officials and scholars, eager to increase their understanding about how each country approaches shared challenges. From cyberthreats and artificial intelligence (AI) governance in a geopolitically turbulent region, to how they will decarbonise their economies and help each other develop trusted supply chains through critical minerals cooperation, to how India's tech talent can help address Australia's skills gaps through migration.

As the premier forum for informal diplomacy between Australia and India, backed by Australian-founded tech company Atlassian and its co-founder Mike Cannon-Brookes, outcomes that grow the relationship through emerging

technology are high on the agenda.

Australia wants to find alternative markets to China and diversify supply chains for its critical minerals. As a country with reserves of about 21 out of the 49 minerals identified in India's critical minerals strategy, Australia is well placed to serve India's national interests required for India's carbon reduction programme.

A shared framework

And while this is the first Dialogue since 2019, due to the novel coronavirus pandemic having kept both countries apart, as two nations we have only grown closer together through enhancing our shared framework for regional security, promoting business and commercial opportunities and strengthening our people to people links, bilaterally and multilaterally.

As India marks 75 years of Independence and surpasses the United Kingdom as the fifth largest global economy, the momentum around this fifth Australia-India Leadership Dialogue and the bilateral fruit it may bear should not be underestimated.

Amitabh Mattoo is Professor at Jawaharlal Nehru University, Honorary Professor, University of Melbourne, and founding CEO of the Australia India Institute. Lisa Singh is CEO, Australia India Institute, former Australian Senator and the first woman of Indian heritage to be elected to the Australian Parliament

Scientists remain sceptical about how nano urea benefits crops

While the inventor says farmers are benefiting from it, several experts have questioned the science underlying its efficacy

JACOB KOSHY
NEW DELHI

Nano urea, a fertilizer patented and sold by the Indian Farmers Fertiliser Cooperative Ltd. (IFFCO), has been approved by the government for commercial use because of its potential to substantially reduce the import bill, but several experts have questioned the science underlying its efficacy.

Prime Minister Narendra Modi, while inaugurating a nano urea production plant at Kalol in Gujarat on May 28, said, "... A small bottle (500 ml) of nano urea is equivalent to one 50-kg bag of granular urea currently used by farmers."

IFFCO's nano urea contains nitrogen, an element critical for plant development, in the form of granules

that are a hundred thousand times finer than a sheet of paper. At this nano scale, which is about a billionth of a metre, materials behave differently than in the visible realm.

Ramesh Raliya, 34, who is credited as the inventor of nano urea and is now a consultant with IFFCO, told *The Hindu* that his process used "organic polymers" that kept the nano particles of nitrogen stable and in a form that could be sprayed on plants.

Chemically packaged urea is 46% nitrogen, which means a 45-kg sack contains about 20 kg of nitrogen.

Contrastingly, nano urea sold in 500-ml bottles has only 4% nitrogen (or around 20 g). How this can compensate for the kilograms of nitrogen normally required

puzzles scientists.

Plants need nitrogen to make protein and they source almost all of it from soil bacteria which live in a plant's roots and have the ability to break down atmospheric nitrogen, or that from chemicals such as urea into a form usable by plants.

To produce one tonne of wheat grain, a plant needs 25 kg of nitrogen. For rice, it is 20 kg of nitrogen, and for maize, it is 30 kg of nitrogen. Not all the urea cast on the soil, or sprayed on leaves in the case of nano urea, can be utilised by the plant. If 60% of the available nitrogen was used, it would yield 496 kg of wheat grain. Even if 100% of 20 g of nano urea, which is what is effectively available, is utilised by the plant, it will yield only 368 g of grain, said



Key element: Nano urea contains nitrogen granules that are a hundred thousand times finer than a sheet of paper. • VIJAY SONEJI

N.K. Tomar, retired Professor of Soil Science at Chaudhary Charan Singh Haryana Agricultural University, Hissar, Haryana.

"Therefore, total attempt is futile and causing sheer wastage of money. This claim of IFFCO is unfounded and will be disastrous for farmers," he notes in a letter to the NITI Aayog as well as the National Academy for Agricultural Sciences. Dr. Tomar

told *The Hindu* that they had not yet responded to his letter.

Dr. Tomar's views are seconded by I.P. Abrol, former Deputy Director-General, Indian Council of Agricultural Research (ICAR).

"Urea is highly water soluble and already reaches the lowest form of concentration when absorbed. How nanoparticles can increase the effectiveness of nitrogen up-

take by being still smaller is unclear to me. That foliar spraying (spraying on leaves) improves fertilizer uptake is known for over half a century. So what's new here?" Dr. Abrol asked.

Unlike the coarse particles that farmers throw onto the soil during sowing, the nano particle form of nano urea, when applied on to the leaves, stimulates enzymes such as nitrase and nitrite re-

ductase, which help plants metabolise nitrogen, Dr. Ramesh Raliya said.

Different parts of the plant contain nitrogen in varying proportions and because nano particles are so small and numerous, they have a lot more surface area relative to their volume, compared with the millimetre-size grains of urea that plants are exposed to nearly 10,000 times more in nitrogen.

Deploying 5G in a world built on 4G technology

The switch to a pureplay 5G architecture is no more a question of whether or not, but when and how

THE GIST

■ Since 4G's inception in the early 2010s, the number of smartphone users have grown significantly.

According to Statista, the total number of smartphone users in the world has nearly doubled from 3.7 billion in 2016 to 6.6 billion in 2022.

■ A 5G-based connected future is upon us. That means deploying services in a world filled with 4G compatible devices. So, telecom operators have two options. They can either build a non-standalone (NSA) or a standalone architecture.

■ In an NSA framework, the operator can use their existing installed capacities and LTE architecture to deploy 5G services while implementing a new radio access network (RAN). The SA model, on the contrary, is a pureplay 5G architecture that provides operators full range of the fifth-generation capability and lets them slice the network. In this architecture, RAN and the core are completely new.

JOHN XAVIER

Since the dawn of mobile communication in the early 1980s, companies and consumers have been adapting to new ways of sending and receiving information. The first-generation technology of this era let people make and receive phone calls through their mobile handheld devices while the second and third generations added text and multi-media messaging, as well as email services to cell phones. The emergence of 4G in the early part of the past decade changed the mobile-telephone landscape. This paradigmatic shift let users stream and download videos at speeds three times greater than 3G. The Long Term Evolution (LTE) standard-based generation had two important characteristics that set it apart from its predecessors.

4G multiplexing

With 4G-capable cell phones, people could make calls over the Internet instead of via telephone networks. This generation's evolution to 4G+ (LTE advanced), which offered download speeds of 200 to 300 Mbps, made it easier for people to connect and talk over the Internet.

Secondly, 4G's multiplexing capability, technically known as orthogonal frequency division multiplex (OFDM), provided a level of efficiency in achieving high data transfer rates while allowing multiple users to share a common channel. The OFDM modulation scheme divides a channel into several subcarriers. These subcarriers are spaced orthogonally so they don't interfere with one another despite the lack of guard bands between them. "OFDM is a very good choice for a mobile TV air interface. It offers good spectral efficiency, immunity to multi-path, good mobile performance, and it works well in single-frequency networks such as those planned for mobile TV," according to a research paper titled 'Orthogonal Frequency Division Multiplexing and its Applications'. It is this aspect of 4G that lets people use social media, download music in an app, and live-stream videos on mobile devices.

Gadgets galore

Since 4G's inception in the early 2010s, the number of smartphone users have grown significantly. According to data intelligence

firm Statista, the total number of smartphone users in the world has nearly doubled in the last seven years to 6.6 billion in 2022, from 3.7 billion in 2016. This number is estimated to rise by another billion by 2027.

Not just users, the number of mobile devices in use have also skyrocketed. The total number of phones and tablets in use is expected to be over 18.2 billion, according to technology market research firm Radicati. When one adds another few billion wearables and Internet of Things (IoT) devices to this mix, the result is a massive data hungry world of gadgets. As the number of connected devices rises, so does our dependence on them to do daily tasks.

The number of devices and things connected to the internet is not confined to the consumer world. Enterprises are also moving to digital channels and optimising the way tasks get done with the help of Artificial Intelligence (AI), Machine Learning (ML), predictive maintenance, and other environmental condition monitoring sensors. For these devices to work in sync with several other applications a far superior networking and connectivity is needed and the decade-old LTE-based generation is ill-prepared to handle workloads and real-time data processing of this magnitude.

Deploying 5G

The latest iteration of mobile connectivity offers low latency, greater download speeds coupled with the ability to connect multiple devices and exchange data in real-time. Building on the multiplexing technology of its predecessor, 5G ushers in a new standard called 5G New Radio (NR), which uses the best capabilities of LTE. 5G NR will enable increased energy savings for connected devices and enhance connectivity. Apart from this, the fifth-generation of mobile communication will use high-frequency millimeter wave (mmWave) bands that operate on wavelengths between 30 GHz and 300 GHz. For comparison, 4G's LTE operates on wavelengths under 6 GHz.

While 5G has been around since the late 2010s, it didn't reach the kind of ubiquity its predecessor enjoyed until mid-2020s. That's because there are fewer 5G-compatible devices in the market compared to 4G ones, and a delayed auctioning and rollout of 5G

airwaves is holding people back from using the service.

A 5G-based connected future is upon us. That means deploying services based on the latest generation in a world filled with 4G compatible devices. So, telecom operators and businesses looking to build their services on 5G have two options. They can either build a non-standalone (NSA) or a standalone architecture.

In an NSA framework, the operator can use their existing installed capacities and LTE architecture to deploy 5G services while implementing a new radio access network (RAN). The operations in the core network will be supported by the existing evolved packet core (EPC) from LTE. This short-to-medium term strategy can help operators reduce capital expenditure and lower operating costs that may arise from installing a new core network.

Germany, for example, used the NSA model to roll out 5G services in 2019. Deutsche Telekom leveraged its LTE-based core to deliver service that is not as fast as pure 5G, but which achieved the purpose of providing broad national coverage to a large proportion of the population and that too in a time-bound manner. The national carrier has now started testing 5G SA architecture in select settings.

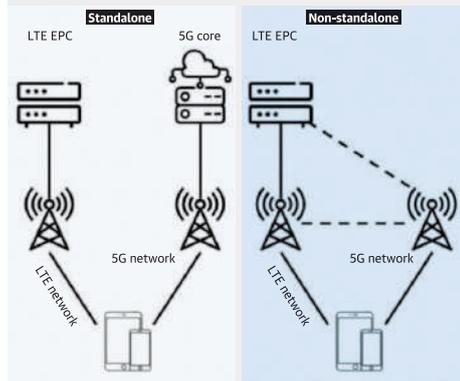
Standalone model

The SA model, on the contrary, is a pureplay 5G architecture that provides operators full range of the fifth-generation's capability and lets them slice the network. In this architecture, RAN and the core are completely new, and there will be a clear separation of different network functions in line with 3GPP recommendations.

U.S.-based Dish Network Corporation deployed a standalone 5G network in 2021. The cloud-native firm is said to be building an Open RAN-based network from scratch, and is looking to run its service on the public cloud. In India, Chinese handset maker Oppo conducted 5G network trials in July 2021 on one of its premium smartphones under the SA network environment provided by Reliance Jio at its 5G Lab in Hyderabad. Reliance Industries Limited plans to expand its 5G network to "every town" in India by the end of 2023, according to the company's Chairman and Managing

5G architecture

When 5G is deployed through a non-standalone framework, the operator uses the existing installed capacities and LTE architecture. However, in a standalone model, the radio access network and the core will be completely new. It gives operators the full range of 5G's capabilities.



Director Mukesh Ambani. The firm plans to implement 5G SA architecture to provide better performance than an NSA based set up.

Different countries and firms are at various stages of 5G deployment. The switch to a pureplay 5G SA architecture is no more a question of whether or not, but when and how. Telecom operators will drive 5G deployment towards a standalone future in the next few years. This will simplify their network operations and improve user experience. Operators may also look to leverage network slicing opportunities by creating dedicated segments for specific users and use cases. Each slice could present an opportunity for operators to build a revenue stream. And just like how the mobile device-based communication era made people adapt to the new technology four decades ago, 5G could potentially make consumers connect and exchange information in a new way.

'Dark sky reserve' to come up in Ladakh

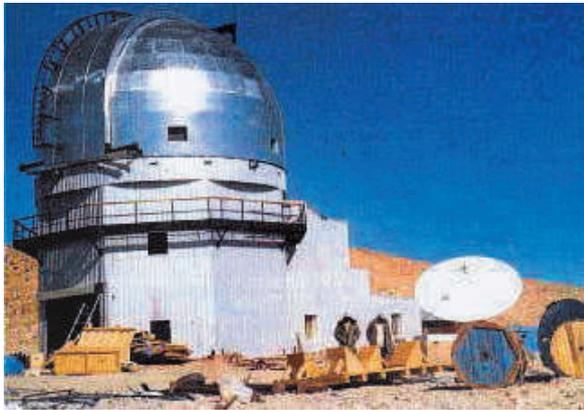
Hanle, situated 4,500 m above sea level, is one of the world's most optimal sites for astronomical studies

JACOB KOSHY
NEW DELHI

In a first-of-its-kind initiative, the Department of Science & Technology (DST) has announced the setting up of India's first dark sky reserve at Hanle in Ladakh in the next three months.

Hanle, which is about 4,500 metres above sea level, hosts telescopes and is regarded as one of the world's most optimal sites for astronomical observations. However, ensuring that the site remains well-suited for astronomy implies keeping the night sky pristine, or ensuring minimal interference to the telescopes from artificial light sources such as electric lights and vehicular lights from the ground.

A dark sky reserve is a designation given to a place that has policies in place to ensure that a tract of land or region has minimal artificial



Reaching the stars: The Himalayan Chandra Telescope at Hanle in Ladakh. ■ FILE PHOTO

light interference. The International Dark Sky Association is a U.S.-based non-profit that designates sites as international dark sky places, parks, sanctuaries and reserves, depending on the criteria they meet. Several such reserves exist around the world but none so far in India.

In June, a three-way Memorandum of Understanding (MOU) was signed among the Union Territory administration, the Ladakh Autonomous Hill Development Council (LAHDC), Leh, and the Indian Institute of Astrophysics (IIA), Bengaluru, which uses and maintains the telescopes, for launching

the dark space reserve. Science Minister Jitendra Singh, on Saturday, following a meeting with R.K. Mathur, Lieutenant-Governor, Ladakh, said that the site "will have activities to help in boosting local tourism and economy through interventions of science and technology".

Annapurni Subramaniam, director, Indian Institute of Astrophysics, said that to promote astro-tourism, villages around Hanle would be encouraged to promote homestays equipped with telescopes that visitors can use to view the night sky.

Villagers would also be trained to help visitors with astronomical observations.

"There would be some restrictions on vehicles and headlights during the evening. There will be delineators on roads like you do outside observatories. People can come, park, observe the sky

and stay in homestays," she told *The Hindu*.

Ideal conditions

The Indian Astronomical Observatory, the high-altitude station of the IIA, is situated to the north of Western Himalayas, at an altitude of 4,500 metres above mean sea level. Located atop Mt. Saraswati in the Nilamkhul Plain in the Hanle Valley of Changthang, it is a dry, cold desert with sparse human population.

The cloudless skies and low atmospheric water vapour make it one of the best sites in the world for optical, infrared, sub-millimetre, and millimetre wavelengths.

The Himalayan Chandra Telescope, High Energy Gamma Ray Telescope, Major Atmospheric Cherenkov Experiment Telescope and GROWTH-India are the prominent telescopes located at the Hanle observatory.

ISRO tests system to recover spent rocket stages

Inflatable Aerodynamic Decelerator successfully test-flown by VSSC on a Rohini-300 sounding rocket

SPECIAL CORRESPONDENT
THIRUVANANTHAPURAM

The Indian Space Research Organisation (ISRO) has successfully tested a technology that could aid cost-effective recovery of spent rocket stages and safely land payloads on other planets.

The Inflatable Aerodynamic Decelerator (IAD) was designed, developed and successfully test-flown by ISRO's Vikram Sarabhai Space Centre (VSSC) on a Rohini-300 (RH300 Mk II) sounding rocket from the Thumba Equatorial Rocket Launching

Station (TERLS) here on Saturday.

"This demonstration opens a gateway for cost-effective spent stage recovery and this technology can also be used in ISRO's future missions to Venus and Mars," ISRO chairman S. Somanath, who was present during the 12.20 p.m. launch, said.

Describing the IAD as a "game changer" with multiple applications for future missions, the VSSC said this was the first time that an IAD had been designed for spent-stage recovery.



Flight path: The Rohini sounding rocket carrying the IAD lifting off from Thumba in Thiruvananthapuram on Saturday.

As its name suggests, the IAD serves to decelerate an object plunging down through the atmosphere.

For Saturday's demonstration, the IAD, made of Kevlar fabric coated with polychloroprene, was packed into the

payload bay of the rocket.

After the nose-cone of the rocket separated, the IAD inflated, balloon-like, at a height of 84 km using compressed nitrogen stored in a gas bottle. The IAD systematically reduced the velocity of the payload through aerodynamic drag, the VSSC said.

Once the IAD fell into the sea, it deflated by firing a deflation pyro valve. The pneumatic system used for inflating the IAD was developed by the Liquid Propulsion Systems Centre (LPSC), Valiyamala.

General Studies Paper I	
A	History of Indian culture will cover the salient aspects of art forms, literature and architecture from ancient to modern times;
B	Modern Indian history from about the middle of the eighteenth century until the present-significant events, personalities, issues;
C	Freedom struggle-its various stages and important contributors / contributions from different parts of the country;
D	Post-independence consolidation and reorganization within the country;
E	History of the world will include events from 18 th century such as industrial revolution, world wars, re-drawing of national boundaries, colonization, decolonization,
F	Political philosophies like communism, capitalism, socialism etc.-their forms and effect on the society
G	Salient features of Indian Society, Diversity of India;
H	Effects of globalization on Indian society;
I	Role of women and women's organization;
J	Social empowerment, communalism, regionalism & secularism
K	Salient features of world's physical geography;
L	Geographical features and their location- changes in critical geographical features (including water bodies and ice-caps) and in flora and fauna and the effects of such changes;
M	Important Geophysical phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc.
N	Distribution of key natural resources across the world (including South Asia and the Indian subcontinent);
O	Factors responsible for the location of primary, secondary, and tertiary sector industries in various parts of the world (including India);
P	Population and associated issues;
Q	Urbanization, their problems and their remedies
General Studies Paper II	
A	India and its neighbourhood- relations;
B	Important International institutions, agencies and fora- their structure, mandate;
C	Effect of policies and politics of developed and developing countries on India's interests;
D	Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.
E	Indian Constitution, historical underpinnings, evolution, features, amendments, significant provisions and basic structure;
F	Comparison of the Indian Constitutional scheme with other countries;
G	Functions and responsibilities of the Union and the States, issues and challenges pertaining to the federal structure, devolution of powers and finances up to local levels and challenges therein; Inclusive growth and issues arising from it;
H	Parliament and State Legislatures - structure, functioning, conduct of business, powers & privileges and issues arising out of these;
I	Structure, organization and functioning of the executive and the judiciary, Ministries and Departments;

J	Separation of powers between various organs dispute redressal mechanisms and institutions;
K	Appointment to various Constitutional posts, powers, functions and responsibilities of various Constitutional bodies;
L	Statutory, regulatory and various quasi-judicial bodies;
M	Mechanisms, laws, institutions and bodies constituted for the protection and betterment of these vulnerable sections;
N	Salient features of the Representation of People's Act;
O	Important aspects of governance, transparency and accountability, e-governance- applications, models, successes, limitations, and potential;
P	Citizens charters, transparency & accountability and institutional and other measures;
Q	Issues relating to poverty and hunger,
R	Welfare schemes for vulnerable sections of the population by the Centre and States, Performance of these schemes;
S	Issues relating to development and management of social sector / services relating to education and human resources;
T	Issues relating to development and management of social sector / services relating to health
General Studies Paper III	
A	Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment;
B	Effects of liberalization on the economy, changes in industrial policy and their effects on industrial growth;
C	Inclusive growth and issues arising from it;
D	Infrastructure Energy, Ports, Roads, Airports, Railways etc. Government budgeting;
E	Land reforms in India
F	Major crops, cropping patterns in various parts of the country, different types of irrigation and irrigation systems;
G	Storage, transport and marketing of agricultural produce and issues and related constraints;
H	e-technology in the aid of farmers; Technology Missions; Economics of Animal-Rearing.
I	Issues of buffer stocks and food security, Public Distribution System- objectives, functioning, limitations, revamping;
J	Food processing and related industries in India – scope and significance, location, upstream and downstream requirements, supply chain management;
K	Issues related to direct and indirect farm subsidies and minimum support prices
L	Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology;
M	Indigenization of technology and developing new technology;
N	Developments and their applications and effects in everyday life;
O	Issues relating to intellectual property rights
P	Conservation, environmental pollution and degradation, environmental impact assessment
Q	Disaster and disaster management
R	Challenges to internal security through communication networks, role of media and social networking sites in internal security challenges, basics of cyber security;
S	Money-laundering and its prevention;

T	Various forces and their mandate;
U	Security challenges and their management in border areas;
V	Linkages of organized crime with terrorism;
W	Role of external state and non-state actors in creating challenges to internal security;
X	Linkages between development and spread of extremism.
General Studies Paper IV	
A	Ethics and Human Interface: Essence, determinants and consequences of Ethics in human actions;
B	Dimensions of ethics;
C	Ethics in private and public relationships. Human Values - lessons from the lives and teachings of great leaders, reformers and administrators;
D	Role of family, society and educational institutions in inculcating values.
E	Attitude: Content, structure, function; its influence and relation with thought and behaviour;
F	Moral and political attitudes;
G	Social influence and persuasion.
H	Aptitude and foundational values for Civil Service , integrity, impartiality and non-partisanship, objectivity, dedication to public service, empathy, tolerance and compassion towards the weaker sections.
I	Emotional intelligence-concepts, and their utilities and application in administration and governance.
J	Contributions of moral thinkers and philosophers from India and world.
K	Public/Civil service values and Ethics in Public administration: Status and problems;
L	Ethical concerns and dilemmas in government and private institutions;
M	Laws, rules, regulations and conscience as
N	sources of ethical guidance;
O	Accountability and ethical governance; strengthening of ethical and moral values in governance; ethical issues in international relations and funding;
P	Corporate governance.
Q	Probity in Governance: Concept of public service;
R	Philosophical basis of governance and probity;
S	Information sharing and transparency in government, Right to Information, Codes of Ethics, Codes of Conduct, Citizen's Charters, Work culture, Quality of service delivery, Utilization of public funds, challenges of corruption.
T	Case Studies on above issues.