
ARE ESG FUNDS LOSING LUSTRE?
THE GREEN HYDROGEN GAMBIT
PRICE ₹200
SEPTEMBER 8, 2023
INDIA
Forbes
THE CLIMATE ISSUE
GREEN-TECH WARRIORS
How a clutch of entrepreneurs is bringing innovation, climate-consciousness and funding together to give shape to viable and scalable technology-enabled ventures
PLUS
Family Members Bring in an X Factor:
David Kohler
(From left) Shrikumar Suryanarayan of Sea6 Energy, Mainak Chakraborty of GPS Renewables, and Kushagra Srivastava of Chakr Innovation
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Humans compound extreme weather events with often mindless burning of fossil fuels

The Heat is On

Haphazard infrastructure creation in a tectonically active region, add to it an erratic, forceful monsoon, and what do you have: Flash floods and landslides of an unprecedented scale, as recently witnessed in the hill states of Himachal Pradesh and Uttarakhand. Is this a climate crisis playing out?

Cut to Europe, which recently reeled under a heatwave. Italy had temperatures you'd usually associate with a New Delhi summer, in the 45 degree vicinity. And prolonged spells of hot weather were witnessed in southern and eastern Europe, from France and Spain to Poland and Greece. Is this a climate crisis playing out?

The US' geography has made it a regular target for everything from tornadoes and hurricanes to wildfires and ice storms. Is climate change increasing the intensity and frequency of these extreme weather incidents?

The year 2023 has also seen record severe wildfires, from Greece to Canada, and Chile to Australia, burning tens of thousands of acres. Is climate change creating the adverse weather conditions that makes it easier for wildfires to spread?

It may not be fair to directly attribute climate change to an extreme weather event. Yet, humans compound these events into disasters with ill-planned development coupled with often mindless burning of fossil fuels. And it's the resultant long-term shifts in temperatures and weather patterns that are worsening America's tornadoes, Australia's wildfires, Europe's heatwaves and Himachal's flash floods.

So how does the world alleviate the impact of climate change? Perhaps a more mindful human being could help. And, alongside, innovations aimed at ensuring that the planet doesn't get warmer than it already is.

This fortnight in our Climate Special, *Forbes India* shines an eco-friendly light on ventures that are doing their bit to reduce emissions and address the impacts of climate change. On the cover are founders/co-founders of three of the startups Divya Shekhar has profiled that are seeking to make significant environmental and social impact.

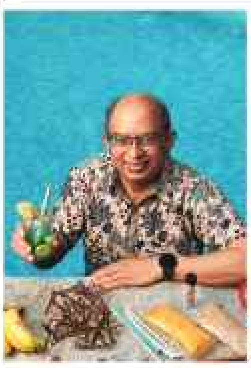
Shrikumar Suryanarayan is the co-founder and chairman of a Bengaluru-based startup that's farming the ocean in the quest for a replacement to crude oil. Sea6 Energy is developing a large-scale sustainable alternative feedstock of seaweed that "can potentially replace everything that we do today with crude oil".

Then there's Kushagra Srivastava who, when at IIT-Delhi, registered a company called Chakr Innovation to reduce emissions that contribute to air pollution. Result? The Chakr Shield, a patented technology that Srivastava declares is the world's first retro-fit emission-control device and that, he claims, captures over 70 percent particulate matter emissions from the exhaust of diesel generators.

The third innovator on the cover is Mainak Chakraborty, one of the founders of GPS Renewables, which may be running Asia's largest bioCNG plant in Indore, among 100 other captive biogas units. Sea6, Chakr and GPS are three of the six climate-tech ventures Divya has profiled. The good news, she says, is that climate-tech is rapidly maturing as an asset class for investors, and such startups are attracting meaningful funding.

Innovation and funding alone, though, won't be enough to rein in the effects of climate change. Citizens, too, will need to be the agents of change. For that, they need to, to begin with, understand the problem, and equip themselves with the knowledge and skills to deal with it. In 'A Study In Grey' on page 58, Anubhuti Matta asks whether the current education system is adequate for an education on climate change. The answer to that may just be blowing in the high-speed cyclonic winds.

STORIES TO LOOK OUT FOR



▲ (From left) Shrikumar Suryanarayan of Sea6 Energy; the education system on climate change falls short in building awareness

Brian Carvalho
Editor, *Forbes India*

brian.carvalho@nw18.com

Best,

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ON THE COVER

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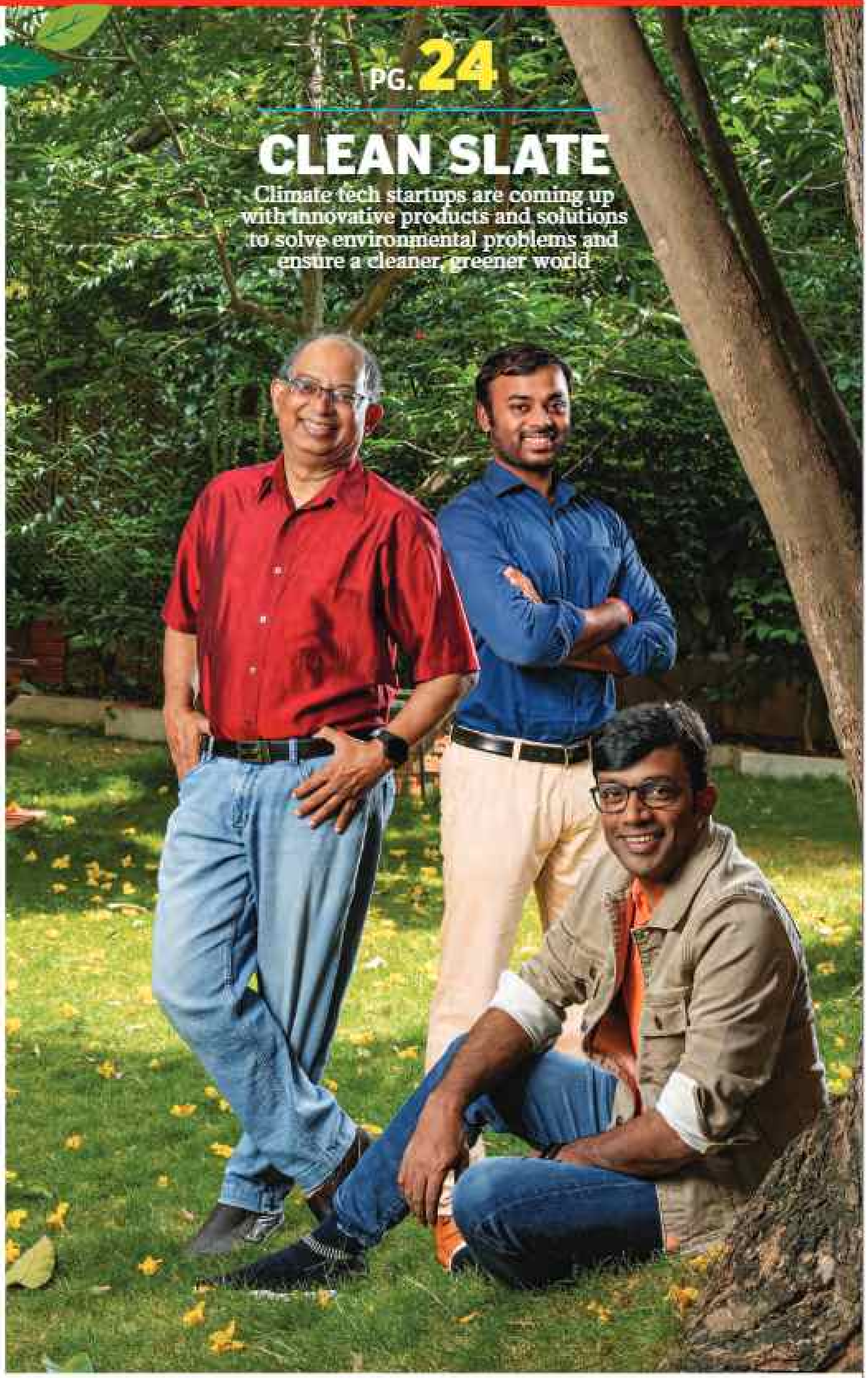

From left: Shrikumar Suryanarayan, co-founder and MD, Sea6 Energy; Kushagra Srivastava, co-founder and CEO, Chakr Innovation, and Mainak Chakraborty, co-founder and CEO, GPS Renewables

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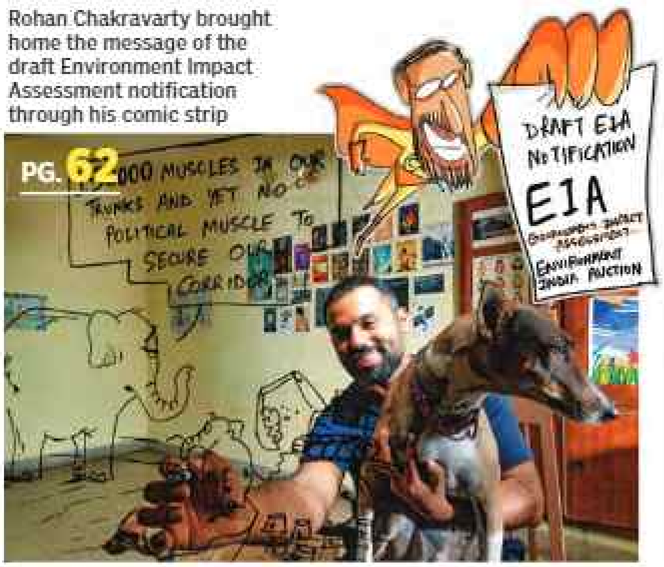

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Editor: Brian Carvalho

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TO OUR READERS
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DATA CHECK

Digital Data Protection Act: What Changes for Enterprises

Experts say enterprises should begin to assess their processes around where data lies within the firm, who can access it, who processes it and how it flows

Non-adherence could attract sanctions and a commercial penalty as high as ₹250 crore

SHUTTERSTOCK

PRESIDENT DROUPADI MURMU gave her assent to the Digital Personal Data Protection Act, which was passed with a voice vote in Parliament, amidst protests on certain areas of concern. It will drive enterprises—referred to as 'Data Fiduciaries' (or those trusted with data)—to process personal data of individuals in a lawful manner, for specific purposes only. It will also apply to enterprises that are based outside of India that deal with serving individuals within India.

"Enterprises will have to review current ways of working, especially for personal data of individuals such as their employees, customers, merchants, vendors, etc to be able to honour the rights that individuals may exercise, such as right to access, update, erase their personal data etc," says Manish Sehgal, partner, Deloitte India. "As more guidance will be released, it's highly recommended that enterprises don't wait and start their readiness journey right away, with fundamental steps of data hygiene."

Non-adherence could attract sanctions and a commercial penalty as high as ₹250 crore.

Companies will have to formulate water-tight processes around where the data lies within an enterprise, who accesses it, processes it, and how data flows from one function to another.

"The right processes, tools and solutions, governance, accountability and most importantly, awareness among people, are core, and must be ready," Sehgal adds. "Once the bill is enacted, transformation is imminent and enterprises should embrace it, not just for compliance purposes but to establish and operate in a privacy enabled environment."

The Bill had three previous iterations that were shelved and has been controversial in parts.

CROSS-BORDER DATA TRANSFER

Earlier versions proposed a whitelist of countries be put in place, which would be eligible to receive Indian data. The DPDPB 2023, however, adopts a negative list approach, which gives the government power to decide which countries get on that list, and with what criteria.

"This represents a significant shift in strategy. The government will have the ability to regulate and limit the transfer of personal data across borders based on specific criteria set by the government," says Supratim Chakraborty, partner at law firm Khaitan & Co. "Such power will not override any law that provides for a higher degree of protection for or restriction on transfer of personal data by an entity. The approach adopted by the government in determining the criteria for the negative list and maintaining harmony between sectoral laws and the Bill will be crucial."

NOTICE REQUIREMENTS GET WEAKER

According to experts at the Internet Freedom Foundation (IFF), compared to the 2019 and 2021 versions, data fiduciaries do not have to inform principals about third-parties with whom their data will be shared, the duration for which it will be stored and if their data will be transferred to other countries.

CONSENT

The Bill mandates that consent for the collection of personal data must meet specific criteria, including being specific, informed, unconditional, unambiguous, and limited to the extent necessary for the specified purpose. "The Bill provides that even where consent is obtained for a specified purpose, it will only be valid where the processing of personal data is necessary for such specified purpose," Chakraborty adds. "This provision has significant implications for businesses as they will now be required to obtain consent for purposes which are necessary for which it is being collected."

"The Bill requires that informed and affirmative consent be taken based on a simple consent notice. A convenient way to withdraw this consent, raise grievances, and exercise certain rights like correction and erasure needs to be provided," adds Arun Prabhu, partner and head-technology & telecom at law firm Cyril Amarchand Mangaldas.

The idea of the consent manager is a welcome innovation, Prabhu adds. "While they are subject to a strict compliance regime, consent managers have the potential to enable individuals to monitor and manage consents in a simple, central manner, thereby reducing consent fatigue which is a global problem, and ensuring that businesses treat data responsibly," he says.

The Bill had three previous iterations that were shelved and has been controversial in parts

GRIEVANCE REDRESSAL

Like Prabhu, Chakraborty says a solid grievance redressal mechanism is key. "The Bill provides a tiered mechanism where individuals will have the option to approach the Data Protection Board of India only after they have exhausted the grievance redressal process enabled by an entity," he says. "Therefore, entities should ensure adequate technological and organisational capabilities to enable individuals to register their grievances as well as resolve grievances in a time-bound manner."

DATA PROTECTION BOARD

According to IFF, the newest version weakens the Data Protection Board as the government will make all appointments. It also removed the obligation for data processors to independently notify the Data Protection Board and affected individuals of any personal data breach. That responsibility now solely lies with the data fiduciaries.

"The Bill places a significant burden on data fiduciaries for overseeing data processing activities conducted by their data processors," Chakraborty says. "While financial penalties for significant contraventions could go up as high as ₹500 crore under the previous version, the new version has retained them in the range of ₹50 crore to ₹250 crore."

RIGHT TO INFORMATION

A major concern is about the proposed amendment to the Right to Information (RTI) Act. The new provision says all personal data is exempt from disclosure in answers to RTI applications. "The amendment of the RTI Act will significantly weaken the historically progressive law," the IFF warns.

Another view is that the bill has been amended to remove references to the Central Public Information Officer and the State Public Information Commissioner, "which are no longer relevant since we have a full-fledged data protection regime that deals with personal information. This exception in the RTI Act existed when there was no DPDP Bill. Now that there is a law on privacy, it has to be rationalised," explains Rahul Matthan, partner at Trilegal.

"Compared to previous drafts, this is a fair one that will be good for business, and will kick-start a data protection jurisprudence in the country," he adds.

• PANKTI MEHTA KADAKIA

(WITH INPUTS FROM NAANDIKA TRIPATHI)

ECONOMY

If Price Shocks Persist, We Have to Act: RBI

RBI Governor Shaktikanta Das thinks headline inflation will rise due to supply disruptions, volatile food and energy prices and geopolitical tensions

ON AUGUST 10, THE SIX-MEMBER rate-setting panel decided to hold the benchmark repo rate at 6.5 percent. Excluding Jayanth Varma, all other members voted to remain focussed on withdrawal of accommodation to align inflation to the target of 4 percent while supporting durable growth in the economy. Importantly, the central bank raised its inflation outlook for the July-September quarter to 6.2 percent from 5.2 percent earlier (see table), signalling that the war against inflation is not over and interest rates may be higher-for-longer, and retained its growth estimate for FY24.

"We have made good progress in sustaining India's growth momentum. While inflation has moderated, the job is still not done... We do look through idiosyncratic shocks, but if such idiosyncrasies show signs of persistence, we have to act," said Shaktikanta Das, Reserve Bank of India (RBI) governor, as he unveiled the bi-monthly monetary policy.

STATUS QUO POLICY: ON EXPECTED LINES

Das cautioned that headline inflation is likely to witness a spike in the near-term due to supply disruptions caused by adverse weather conditions: "It is important to be vigilant about these shoc,ks with a readiness to act appropriately so as to ensure that their effects on the level of prices do not persist. There are risks from the impact of the skewed monsoon so far, a possible El Niño event and upward pressures on global food prices due to geopolitical hostilities."


INDRANIL MUKHERJEE / AFP

RBI Governor Shaktikanta Das (centre) arrives at a press conference in Mumbai on August 10

Retail inflation rose from 4.3 percent in May to 4.8 percent in June, and most economists predict Consumer Price Index (CPI) will breach RBI's upper threshold of 6 percent in July. The pick-up in inflation is largely on account of higher prices of food items. Overall, core inflation was stable in June. The RBI feels the spike in vegetable prices will add upside pressures on the near-term trajectory of retail inflation.

It hopes that fresh arrivals of fruits and vegetables will ease prices. The improvement in the progress of the monsoon and kharif sowing could also help cool prices. Furthermore, the outlook for crude oil prices is unclear, given the possibility of production cuts by some OPEC members.

Lakshmi Iyer, CEO-investment and strategy, Kotak Alternate AMC, says, "While status quo on rates wasn't much of a debate, the key thing to watch out for was the tone of the MPC [Monetary Policy Committee] guidance. Here, the RBI seems to sound cautious and ready to act as and when the situation warrants, but not as hawkish as the markets would have expected. It also suggests that much of the possible negative outcomes were already in bond prices."

On the growth front the RBI is less worried, with improvement in investment activity, led by government capital expenditure, increased business optimism, and construction activity driven by rise in cement production and steel consumption. In the first quarter, capacity utilisation in manufacturing was 76.3 percent against the long-term average of 73.7 percent.

"These underlying developments and the upcoming festival season are expected to provide support to private consumption and investment activity. The spillovers from weak external

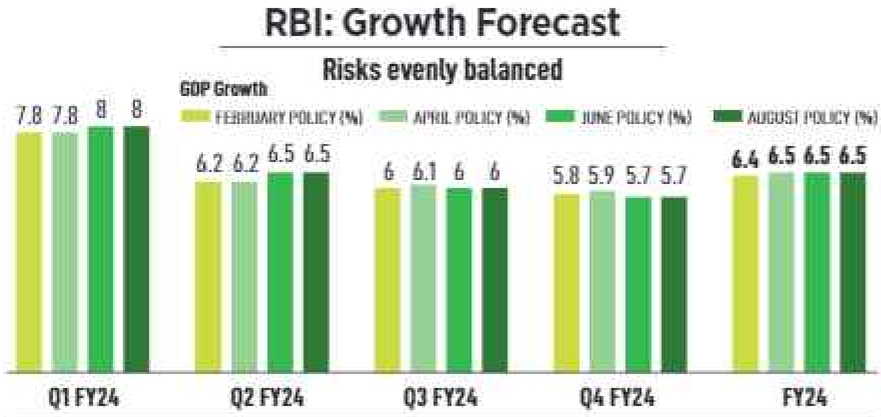
6.2%

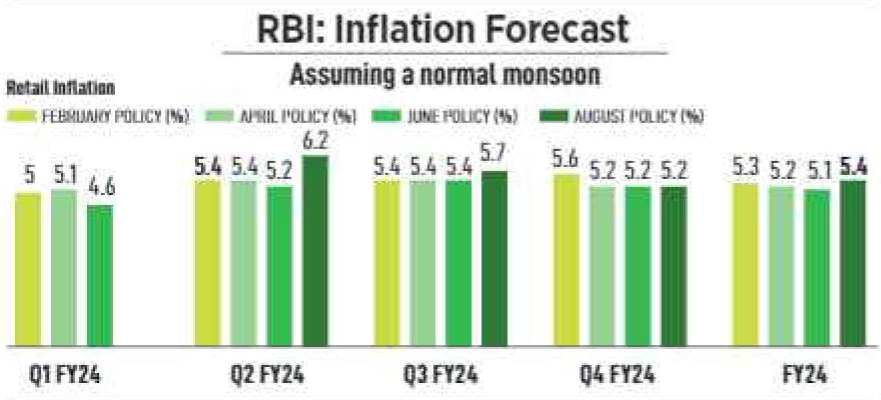
The RBI's inflation outlook for July-September, up from 5.2 percent earlier

REUTERS

demand and geopolitical tensions, however, pose risks to the outlook," Das said. Weak global demand and volatility in financial markets, geopolitical tensions and geoeconomic fragmentation pose risks to the RBI's GDP growth outlook for FY24 at 6.5 percent. It did not revise its growth estimates and believes risks are evenly balanced.

Aurodeep Nandi, India economist, Nomura says, "The dilemmatic issue for the RBI was that on the one hand, the sharp rise in food prices has led to a sharp increase in the inflation outlook, which risks impacting the RBI's inflation targeting credibility if it sounded too dovish. But on the other hand, the supply side nature of these shocks, and softening core inflation, limits the need for monetary policy tightening. The RBI struck a fine balance between the two but also expressed the readiness to act in case inflationary pressures generalise."





ICRR: THE SURPRISE ELEMENT

The bank, however, in an unexpected move announced a temporary imposition of incremental cash reserve ratio (ICRR) of 10 percent on net demand and time liabilities, for May 19 to July 31, to absorb excess liquidity. "Hiking CRR would have monetary policy connotations. The temporary increase aims to be a non-disruptive way of dealing with excess liquidity in the backdrop of demonetisation of ₹2,000 notes," Nandi adds.

Since the RBI announced withdrawal of ₹2,000 currency notes on May 19, about 88 percent or ₹3.14 lakh crore has been deposited in banks. Madhavi Arora, lead economist, Emkay Global, says the immediate impact of RBI absorbing liquidity via ICRR will be a mild hardening of money market rates for borrowers, including NBFCs and corporates. "For banks there will be slight impact on their net interest margins (3-4 bps) depending on the instruments where they were parking the money—assuming 14.5 percent effective CRR. Overall, this will also lead to some interest loss for banks as they were parking the short-term liquidity into short-term personal loans and money markets, instead of parking with RBI in variable reverse rate repo, which also helped in some softening of CP/CD rates," she says.

Iyer points out that ICRR hike will suck out around ₹95,000 crore from the system. "This could dampen short-term bond yields in the near term. Bond prices could see relief buying as the mood was quite sombre assuming a very hawkish commentary." RBI stated the overall daily absorption under the liquidity adjustment facility was ₹1.7 lakh crore in June and ₹1.8 lakh crore in July.

Pankaj Pathak, fund manager-fixed income, Quantum AMC, believes that despite the 10 percent ICRR, the banking system liquidity is likely to remain in surplus of more than ₹1 lakh crore for one or two months. "This should not have any durable impact on the bond yield curve though money market yields might inch up 10-15 basis points in coming weeks. We expect the Indian bond yields to remain in the broader range of 7 to 7.3 percent in coming months, tracking crude oil prices and the US treasury yields. Longer term outlook looks more favourable as the rate hiking cycle is nearing its end in most economies and rate cutting cycle can start early next year," he says.

In June, the RBI kept rates unchanged, holding the benchmark repo rate at 6.5 percent continuing with the policy stance and focus on withdrawal of accommodation. RBI marginally lowered its inflation forecast to 5.1 percent from 5.2 percent, but kept its growth estimate unchanged at 6.5 percent for FY24. As last time, Das reiterated, "Let me re-emphasise that headline inflation still remains above the target and being within the tolerance band is not enough. Our goal is to achieve the target of 4 percent."

• NEHA BOTHRA

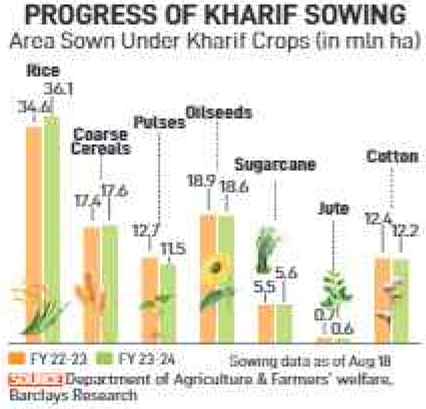
INFOGRAPHICS: MUKESH SINGH

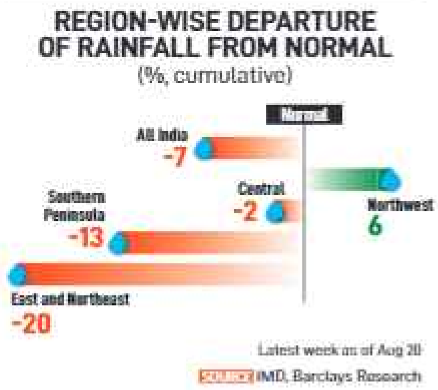
RAIN WATCH

Monsoon Weakens, Area Sown for Pulses Lagging

Cumulatively, pan India rainfall is still normal, at 7 percent below the LPA in June 1-August 20

With the below normal rainfall for August, irrigation sources will be crucial for improving sowing of crops and soil moisture





EVEN AS MONSOON RAINFALL had caught up with speed and spread— barring the eastern region—in July, the pace has slowed down in August. Gradually approaching the end of the season in September, rainfall became a tad scanty in a few regions in the last two weeks of August.

Cumulatively, pan India rainfall is still normal, at 7 percent below the LPA (long period average) for the period from June 1 to August 20, according to an analysis by Barclays based on Indian Meteorological Department (IMD) data. IMD classifies rainfall within 10 percent of the LPA as normal.

Region wise, the cumulative surplus rainfall reduced in the northwest and central regions, while the southern region slipped into deficit. As of August 17, storage in key reservoirs stood at 62 percent of total capacity, lower than last year's level at this stage of the monsoon season. It is now also marginally below the historical average.

Kharif sowing is near completion for most crops, but the area sown for pulses is lagging in major producer states. With the below normal rainfall for August, irrigation sources will be crucial for improving sowing and soil moisture, says Rahul Bajoria, managing director, head of EM Asia (ex-China), economics, Barclays.

Forbes India's Rain Watch series simplifies rainfall status, water reservoir levels and sowing pattern of kharif crops, using data analysis by Barclays.

• NASRIN SULTANA

INFOGRAPHICS: MUKESH SINGH; IMAGE: STR / NURPHOTO VIA GETTY IMAGES

FINTECH

The New Way of Making Online Transactions

RBI Governor Shaktikanta Das recently announced the adoption of conversational payments

Conversational payments facility will be made available in both smartphones and feature phones-based UPI channels, as per RBI

SHUTTERSTOCK

ON AUGUST 10, ALONG WITH major announcements such as an unchanged repo rate at 6.5 percent, Reserve Bank of India (RBI) Governor Shaktikanta Das said the central bank will adopt conversational payments on Unified Payments Interface (UPI) through artificial intelligence (AI). It will enable users to converse with AI-powered systems to make payments. The facility will be made available in both smartphones- and feature phones-based UPI channels. Initially the feature will be in Hindi and English, and will subsequently be made available in more Indian languages. The RBI has instructed the National Payments Corporation of India (NPCI) to issue instructions to implement 'conversational payments' soon.

WHAT ARE CONVERSATIONAL PAYMENTS?

Conversational payments are those payments which are processed during a chat/messaging conversation. The transaction which happens during a live chat, between two parties in which one is the chat operator and the other the payment provider.

Example: Suppose a user types in a query for a product on a beauty/ skincare brand's website/app. The website/app will relay options; when the customer chooses a product and needs to make a payment, the chat operator on the website/app will send a direct payment link to the user to make the payment real time without re-directing to a UPI app.

BENEFITS OF CONVERSATIONAL PAYMENTS

Conversational payments result in a faster way of making payments online. It can also be a safer mode of payment as the transaction will take place directly between the two parties involved without the intervention of a third party. These payments also enable the chat operator to stay with the customer till the end and take feedback which can help them improve their business process.

UPI-LITE

To further promote the utilisation of UPI Lite, an on-device wallet which allows feature phone users to access UPI networks, the RBI is devising plans to introduce offline transactions using Near Field Communication (NFC) technology. This will not only address connectivity challenges by enabling retail digital payments in low or no internet/telecom zones, but also expedite transactions with minimal declines. To use UPI Lite, customers can add funds from their bank accounts to the app by authentication (AFA) or through UPI AutoPay, which needs to be registered online using an AFA. During the Monetary Policy Meet, the upper limit of a UPI Lite payment transaction was raised to ₹500 from ₹200, while the total limit of UPI Lite balance for an on-device wallet is ₹2,000 at any time.

AI AND THE BANKING SECTOR

Even before the RBI announcement on the use of AI to make conversational payments, other private/public sector banks in India have started or are planning to begin the use of AI to further improve a user's banking experience. Banks are using AI in the form of chatbots and are partnering with fintech firms to include new-age technology in banking services. For example, HDFC Bank has its chatbot Eva which provides customers and non-customers with information about the lender's banking services. In its annual report for FY23, the State Bank of India said it will enhance the use of business analytics, AI and machine learning in decision-making and operations. Axis Bank also said it is looking at using ChatGPT's enterprise version for enhancing communication services with customers.

• SAMIDHA JAIN

Meet The All New Air India

New logo, new branding, livery will be seen starting December 2023; and yes, the Maharaja stays

(From left) Campbell Wilson, CEO and MD, Air India, and N Chandrasekaran, chairman, Tata Group, unveil the new livery of the airline at the brand relaunch event

"EVERY DAY, I GET A COUPLE OF mails, either criticising or complimenting Air India," said N Chandrasekaran, chairman of Tata Group at an event to mark a major milestone in Air India's journey. "But even in those criticisms, I receive some amount of concern and thought with the question—can you not fix it, can you not get it done faster? And in our attempt to take this criticism with care, I present to you the airline's new brand identity," he added.

The Tata Group-owned airline unveiled a modern and new brand identity and new aircraft livery on August 10, which, according to Chandrasekaran, is symbolic of a resurgent India.

The new look reimagines the iconic Indian window shape, historically used by Air India, into a gold window frame, "that denotes a golden window of opportunity," said Chandrasekaran.

Titled 'The Vista', the new logo symbol, inspired by the peak of the gold window frame, also signifies limitless possibilities, progressiveness, and the airline's bold outlook for the future, he said.

"For the past 15 months, we have been at work and we are committed to make this work. Our vision is to make this airline exceptional in terms of the customer service that Air India used to be known for," he said. "In the past four months, we have put together a strong team to work on the best IT systems, and the best of machine learning and artificial intelligence."

Designed in partnership with brand transformation company FutureBrand, the brand identity features a palette of deep red, aubergine, and gold highlights, as well as a chakra-inspired pattern.

Travellers will be able to see the new logo starting December 2023, when Air India's first Airbus A350 enters the fleet in the new livery.

And the Maharaja stays. Campbell Wilson, Air India CEO and managing director said, "The rumours of its demise have been greatly exaggerated. The Maharaja will live on and continue to be part of the airline's journey into the future."

The carrier will have a gold silhouette of the Maharaja on crockery and glassware in premium cabinets.

Among its investments to achieve the new vision, the airline is acquiring 470 aircraft from Airbus and Boeing at US$750 billion with deliveries starting November 2023. The transformation of the fleet has already begun with the airline leasing and buying 20 widebody aircraft this year. Additionally, a US$400 million programme to completely refurbish its 43 widebody aircraft fleet will commence mid-2024, which will include installation of new seats in every cabin, new inflight entertainment systems and inflight Wi-Fi connectivity.

The airline is also working on a new website and a mobile app, and a 24X7 customer contact centre in nine Indian and foreign languages by the end of 2023.

The carrier has also onboarded more than 5,000 new staff including cabin and cockpit crew and is also building an aviation training academy in India.

"Each one of you represent Air India for me. Our commitment is only getting stronger, and we will make this work," Chandrasekaran said.

• ANUBHUTI MATTA

IMAGE COURTESY: AIR INDIA

SOCIAL MEDIA

On Twitter, Post and Earn

From rebranding to X and offering payouts to content creators to gain new users and increase engagement, a lot has happened at Twitter in the last 10 months

EIGHT WEEKS AFTER taking charge as chief executive at X (formerly Twitter), Linda Yaccarino hosted her first Spaces on August 10. Minutes before she was to give an interview to *CNBC*—also live streamed on Spaces—Yaccarino spoke about the need for free expression and how X is committed to that and the safety of the platform. "The realness of X is what makes it a habit," she said.

Elon Musk has introduced a barrage of changes in the last 10 months. From launching a Twitter Blue subscription, laying off over 6,000 employees, removing the legacy blue checkmarks for non-subscribers of Twitter Blue, limiting the number of tweets users can read in a day, rebranding to X, and opening up its ad revenue sharing programme globally, Musk has stirred up the microblogging platform.

Twitter's ad-portal traffic dropped by 10.6 percent in July from the year before, according to Similarweb, which analyses advertising portals. Global traffic on the platform also declined since January, falling 5.8 percent as of June. The engagement rate also fell during that same period, from approximately 88 million users to 83 million. Twitter has also lost nearly half of its advertising revenue since it was bought by Musk, according to the *BBC*.

In July, the company announced that limited content creators on the platform would be eligible to get a part of the advertising revenue it earns. They will get a share of revenue from ads displayed in their replies.

JONATHAN RAA / NURPHOTO VIA GETTY IMAGES

The eligible creators should be verified with at least five million impressions on their posts in each of the last three months and have a Stripe payment account linked to Twitter.

On August 10, the company changed the requirements. Many content creators from India got the payouts as they qualified for the previous criteria. For instance, Ginger Monkey founder Abhishek Asthana, known as @Gabbbarsingh on Twitter, has about 1.4 million followers. With around 290 million impressions in the last three months, he was eligible to earn $2,544. "I applied on July 27 and received a confirmation that the money would be credited to my account." He received it in 16 days.

Twitter's ad-portal traffic dropped by 10.6 percent in July from the year before

Twitter sharing ad revenue with users encourages content creation, which addresses some of the biggest challenges it has faced over the years, including new user acquisition, time spent on the platform, and engagement. Instagram, YouTube, and TikTok have seen exponential growth with programmes focusing on creators. With this move, Musk is building Twitter as a go-to platform for content creators, says Hitesh Rajwani, founder and CEO of Social Samosa.

Finfluencer and content creator Neha Nagar, who has 84.8K followers on Twitter, also applied for the creator payout programme. Currently, she monetises through ad revenue sharing on YouTube. "I expect the same from Twitter because it motivates me to consistently deliver high-quality content," she says.

Concerns about the legitimacy of the content still remain though. "Creators who plagiarise content might lose eligibility for monetisation or get copyright strikes like YouTube and Instagram, but we will have to wait and watch how the platform tackles this," says Rajwani.

• NAANDIKA TRIPATHI

$81.5 bln

Tesla's total revenues in 2022, an increase of more than 50 percent from 2021

INDIAN ON TOP

Tesla's New India Connect

Vaibhav Taneja has become the automaker's second Indian-origin CFO at a time when the company is eyeing plans to manufacture in the country

TESLA HAS A NEW CFO. And this time again, he is an Indian.

Vaibhav Taneja, a Delhi University commerce graduate, was appointed as the automaker's CFO on August 7. In 2021, he had been appointed as a director for Tesla's Indian arm, Tesla India Motors and Energy Private Limited. Deepak Ahuja, the Mumbai-born executive, had earlier served as Tesla's CFO.

Taneja joined Tesla in 2017 and has been its chief accounting officer; he replaces Tesla veteran and a widely speculated successor to founder Elon Musk, Zachary Kirkhorn, who will stay on until the year-end to ensure a smooth transition. "Tesla [has] announced that I've stepped down from my role as chief financial officer, succeeded by our chief accounting officer, Vaibhav Taneja," Kirkhorn said in a LinkedIn post. "Being a part of this company is a special experience and I'm extremely proud of the work we've done together since I joined over 13 years ago."

Before joining Tesla, Taneja (45) had a 16-year-stint at PwC in both the US and in India, followed by finance and accounting roles at US-based SolarCity Corporation, which Tesla acquired in 2016. "Right from the time he joined PwC, there was a sense of purpose in him," Deepak Kapoor, former chairman of PwC India, tells *Forbes India*. Kapoor had hired Taneja for his first job as an assistant manager at PwC and remembers him as someone who "sticks out in your memory". "Through the 40 years or so at the firm, you tend to categorise people in different brackets, and Vaibhav was always among the top stars, the three or four that stand out."

Taneja's appointment as CFO comes at a time when Musk has laid out elaborate plans to ramp up manufacturing in its attempt to ride on the headstart in the global electrification journey. The world's wealthiest man has already announced India as his next stop to manufacture vehicles.

Taneja's appointment comes at a time when Musk has laid out plans to use the headstart in the global electrification journey

Much of that's because the American automaker quickly wants to take advantage of its position as a cost leader in the global electrification journey, even as it struggles with supply constraints. Then there is the growing competition from incumbents such as Mercedes, BMW, and Volkswagen, which have been accelerating their electric journey, and, in the process, drawing away potential buyers from Tesla, which had for long been seen as the archetype of electric vehicles (EV) globally.

"What Vaibhav brings to the table, apart from his sense of purpose is his excellent people skills," adds Kapoor. "He is very social, is an excellent accountant, and on ethics is very straightforward. His standards are very high." Kapoor also recounts how Taneja was quite clear early on about going to work with a multinational, even though he could have made partner at PwC.

Taneja, meanwhile, is among a handful of Indian-born executives who have made it to the top at the world's most valuable auto brand. In 2020, Jay Vijayan, a former CIO of Tesla, who worked closely with Musk built Tekion, a cloud-based subscription service for automakers, into a unicorn after his company raised $150 million in a Series C financing round.

• MANU BALACHANDRAN

₹92,267 cr

Loans given out by 76 fintech lenders in FY23, surveyed by Fintech Association for Consumer Empowerment, an industry lobby

SHUTTERSTOCK

INTERVIEW

Every App a UPI App and Credit is the Next Big Thing: Anuj Kacker

UPI is widespread but its potential is far from exhausted, says the co-founder of neobank Freo

Q What's the big picture with respect to how fintech is playing out in India?
In our pursuit of a $5 trillion economy, the key lies in boosting GDP per capita, largely driven by middle-class consumption. While the affluent spend more per person, the masses must also partake, necessitating robust financial movement. This is where the entirety of the banking sector, alongside government initiatives like infrastructure development, comes into play. Amid these dynamics, fintech is set to shine over the coming decade. As founders and a team, we stand poised at a crucial juncture, at Freo, contributing our part to this journey.

Embedding the UPI payment experience within the native environment of an app will enhance conversion rates and decrease dropouts

Q What do you make of this new feature being introduced via an SDK (software development kit) so people can pay within an app using UPI?
My interpretation is that its origins trace back to a vision of transforming every app into a UPI-enabled platform. While I lack the details, my assumption is that someone envisioned a scenario where every app seamlessly integrates UPI functionality. However, practicality posed challenges, including security, monetary transactions, bank involvement, and authentication, making instant implementation impossible. Nonetheless, this vision set the foundation.

Now, a new plugin or SDK has emerged, offering a solution. The noteworthy aspect is that users won't need to switch apps to make payments, addressing a common inconvenience. By embedding the UPI payment experience within the native environment of the app, the transition appears seamless, although the backend may still interact with another payment app. This integration is anticipated to enhance conversion rates and decrease dropouts.

Q What does this mean for the large payments app providers?
I'm uncertain about the extent of the impact. Companies like PhonePe and Google Pay are adept at developing plugins and SDKs. They're already involved in the payment gateway sector and are likely to integrate these tools directly or through third-party players. This move could lead to a competitive rush, making it easier for apps to embed UPI payment functionality swiftly. The possibility of these players charging merchants for using their code might emerge. Although effort will be required to create and market these SDKs, the presence of established UPI players with significant market shares means they can efficiently onboard merchants. This may not create a massive disruption.

Q What do you think is the government's reason for doing this?
My response here is a bit speculative, but the broad-reaching vision might be about turning every app into a UPI platform to ensure widespread access. While UPI is widespread, the goal could be to expand its reach even further. The introduction of credit on UPI rails seems to be the next step, promoting economic growth. The government and NPCI play vital roles in this endeavour, balancing expansion with security. The central idea could be to progressively broaden accessibility while safeguarding data integrity, making these actions a part of a strategic plan to achieve this vision.

Q And what more could we do with UPI?
UPI has widespread use, but its potential is far from exhausted. Despite UPI's high usage, cash circulation remains substantial. Introducing diverse use cases like UPI Lite, collections, and auto-pay could make UPI truly ubiquitous, gradually reducing cash dependence. The prospect of international implementation could also facilitate commerce, fostering better trade relations and forex revenue.

• HARICHANDAN ARAKALI & PANKTI MEHTA KADAKIA

SHUTTERSTOCK

Hope for a Better Tomorrow

It's always a good time to talk about climate change

By DIVYA SHEKHAR

This is the year of global climate stocktake.

During the crucial COP28, to be held in the United Arab Emirates (UAE) in November, world leaders will discuss the collective progress they have made around climate action. Before that, in September, India will preside over the G20 Leaders' Summit in Delhi, a culmination of all the G20 processes and meetings held through the year, with climate as one of the focus areas.

For many decades, stories about climate change were met with denial or indifference, like something that either did not exist or was happening so slowly that it will only hit us in the very distant future. Over the last few years, however, voices championing the climate movement have made us sit up and take note of the immediacy of the crisis, as well as the role we all play in both adding to the chaos and preventing it.

In this context, *Forbes India*'s special edition seeks to present a nuanced take on various aspects of the climate conversation in India: What is the GDP loss due to climate change? How green are ESG stocks? What is India's green energy transition blueprint?

We attempt to answer some of these questions, apart from turning the spotlight on a few young startups that are using technology to build climate-conscious businesses. From an AI-powered light harvesting glass to harness solar power to farming the ocean to make biofuels and bioplastics, you'll find stories of six climate-tech businesses in the following pages.

There is also reportage on the state of climate education in the country, how India's solar power push economically empowers women in rural India, and how a clutch of comic creators is using their wit and skills to simplify climate concepts and drive change on-ground.

As we await the G20 Summit under India's presidency, "timely grassroots implementation towards our own climate ambitions will define the success of India's leadership role in limiting the climate crisis", writes activist Sumaira Abdulali in a column on page 70. "Our planet's climate emergency is here."

Clean Slate

Climate tech startups are coming up with innovative products and solutions to solve environmental problems and ensure a cleaner, greener world

By DIVYA J SHEKHAR

CHAKR INNOVATION

Setting the Wheels in Motion

Through its patented technology, the cleantech startup offers an emission-control solution. It is now developing an indigenous energy storage technology to reduce dependence on lithium-ion

In 2015, following a survey by the World Health Organization (WHO), Delhi had earned the notorious moniker of being the 'world's most polluted city'. At the time, Kushagra Srivastava was a second-year engineering student at IIT-Delhi. His faculty members were part of various expert committees and panels working with the government to tackle the air pollution issue, and on campus, there were regular discussions about how students could use their technological prowess towards this menace.

The next year, Srivastava, being a "native Delhi-ite", formally registered a company called Chakr Innovation to develop innovations to reduce emissions that contribute towards air pollution. He spent the next two-and-a-half years on research and development (R&D), and in 2019, the product was ready for commercialisation. Chakr had developed what Srivastava calls the world's first retro-fit emission-control device (RECD) for diesel generators. The Chakr Shield, a patented technology, reportedly captures over 70 percent particulate matter emissions from the exhaust of diesel generators. A video on the Chakr website says the innovation converts the pollution captured into ink, and "each litre of ink purifies 700 litres of air".

"We have already deployed this technology at over 1,000 locations," says Srivastava, adding that they have more than 150 customers, including Hindustan Petroleum, the Tata group, ITC, Toshiba and The Coca-Cola Company, among others. He

Chakr Innovation

FOUNDED IN: **2016**

FOUNDERS: **Kushagra Srivastava** (CEO); **Arpit Dhupar, Bharti Singhla** (both no longer with the company)

FUNDING: **$22 million** (about ₹162 crore); last funding round was Series B in **November 2021**

INVESTORS: Include **Neev Fund, ONGC Startup Fund, IDFC-Parampara Fund, IAN Fund, Globevestor; angel investors Jyoti Sagar, Rajiv Mehrishi**

KEY INNOVATION: A **patented retro-fit emission control device** for diesel generators that purportedly captures over **70%** of particulate matter emissions from the **exhaust** of the **generators**

Kushagra Srivastava, co-founder and CEO of Chakr Innovation, with an electric bike that runs on an indigenous battery, in Gurugram adds that so far, over "40,000 metric tonnes of carbon dioxide has been prevented from going out into the air by deploying this emission-control technology at various locations".

The RECD has received a type approval from the Central Pollution Control Board (CPCB), which gives Chakr a strong moat, believes Akshay Panth, chief investment officer of Neev Fund, a climate-focussed private equity fund that led the Series B fundraise of the cleantech startup in 2021. Anyone else coming into the sector will have to incur "significant amount of capital expenditure, and conduct hours of testing on the devices with the accredited government labs to get these approvals".

He adds that from a customer acquisition perspective, "they have the ability to generate repeat business from existing customers, which validates the product".

Panth says Chakr only had a single product at the time of their investment and their thesis was that it had to become a multi-product company. "On the base case, we saw a large market for the RECD itself to build a strong, stable business in this case, but if they were to add additional products and services, then the multiplier effect becomes significant," he says.

Srivastava, who started Chakr with two other co-founders, both of whom are no longer with the company, says the startup has raised close to \$22 million (close to ₹162 crore) in funding, and has developed other technologies—one which has been commercialised, while another is in the R&D stage.

Their diesel fuel kit "enables a diesel engine to run on a mix of gas and diesel. It uses 70 percent gas and 30 percent diesel, which reduces emissions," says Srivastava, adding that the tech has been deployed at various locations in the country. Another innovation that has been in the works for the past three years is an indigenous energy storage technology that Srivastava claims will reduce India's dependence on lithium-ion, which is currently the default energy storage solution. As of now, India relies heavily on China and Hong Kong for its lithium requirements.

Chakr's aluminium-air energy storage technology has an initial capex that is 40 percent less than lithium-ion, and the operational expense is 30 percent less than an internal combustion engine, says a June 2022 presentation deck made by the startup.

"This energy storage technology is recyclable, unlike lithium-ion, where the batteries you need to dispose of," Srivastava adds. In electric vehicles, claims the presentation, the aluminium storage tech is non-flammable, unlike lithium-ion, has three times the range, and oxidised aluminium can be replaced, eliminating recharging time and infrastructure.

The cleantech startup is also developing a software platform for connecting decentralised sources of energy, which is in the R&D stage. Srivastava claims that Chakr is a profitable company, with average revenues of ₹8-10 crore a month.

As an investor, Panth calls the company "a multi-bagger" and feels that there are strong commercialisation prospects for the solutions that are currently in development.

AMIT VERMA

GPS RENEWABLES

Converting Waste to Bioenergy

Founders of the Bengaluru-based venture—who run what is reportedly Asia's largest bioCNG plant—believe they have barely scratched the surface of the billion-dollar biofuels industry

Mainak Chakraborty did not opt for campus placements at the end of his postgraduate management diploma course at the Indian Institute of Management Bangalore (IIM-B). He wanted to start something on his own, a for-profit venture that was environment-facing, but was not sure what to do. Soon enough, along with a senior from IIM-B, Sreekrishna Sankar, he realised there was a business opportunity in a problem that was staring IT city Bengaluru in the face: Waste management. This led them to thinking about converting waste to bioenergy, where they realised technology could play a role and help the engineers put their skillsets to good use.

At the time (2010-2011), their idea was to "product-ise and decentralise biogas production for an urban setting", Chakraborty says, by helping commercial spaces like hotels or corporate campuses convert their organic waste into energy. The duo launched GPS Renewables, a biofuels technology and execution company, in 2012. Until then, they had only seen solutions like cow dung gas plants that were designed to provide low-cost waste management solutions in rural areas. These were large, often smelly structures with a large footprint

Sreekrishna Sankar (left) COO, and Mainak Chakraborty, co-founders and CEO, of GPS Renewables and involving a lot of civil work.

For urban settings, they had to find a way to make these plants smaller, not smelly, and as less messy as possible. In the absence of huge swathes of land, they had to build the plant vertically, spread across many floors. The health of these plants had to be monitored and tracked remotely. The non-profit Akshaya Patra helped them set up their first commercial pilot. They also catered to corporate campuses and luxury hotels, often retrofitting their solutions to fit the available space.

Till now, GPS Renewables has set up close to 100 captive biowaste-to-energy plants across the country. "We have an original artificial intelligence [AI] solution called the BiogasBot with patented hardware, which keeps track of the bio-health of all our 100 plants across India," says Chakraborty.

They also run two large, functional bioCNG plants. One in Indore, reportedly Asia's largest bioCNG plant that processes about 500 tonnes of organic waste, and the second in Lucknow. "We are also setting up multiple plants that convert paddy straw, which is often burnt in the North and is a source of smog every winter, into bioCNG for vehicular applications," Chakraborty says, adding that at Haji Ali in Mumbai, they run one of the world's first biogas-powered electric vehicle (EV) charging station.

"We have multiple innovations, from special microbes and our own monitoring software to specialised products for carbon dioxide capture and removal," says Chakraborty, claiming that GPS Renewables, with a 300-people strong team, has an annual revenue run rate of ₹500 crore and is a profitable company.

The Bengaluru-headquartered company has raised about $20 million in funding, the most recent being a Series B round of about $17 million, led by Neev Fund, in 2022. Their Series A fundraise was in 2020. A bulk of the funding came only after seven to eight years of operations, Chakraborty points out, explaining how it has not been easy for startups in the climate tech space, with their engineering solutions and innovations having long gestation periods, finding it difficult to raise funds.

"Until then, we were very frugal with our operations and spends, surviving on seed money, R&D grants, debt and non-collateral loans under the government's Credit Guarantee Fund Trust for Micro and Small Enterprises, and purchase-order financing," Chakraborty says.

"We are bullish on GPS and what the company will be able to achieve in the biofuels space," says Akshay Panth, chief investment officer, Neev Fund, which led the Series B fundraise. "When we invested, GPS was an SME that was growing fairly rapidly. They had done the Indore bioCNG project, were on the cusp of growth, and even though a lot of focus was on project and execution, they were a tech-driven company at the core."

According to Panth, one challenge is that biofuels is still nascent with multiple segments emerging at a rapid pace. "There is a constant tussle between demand and supply, and a stable ecosystem is needed now," he explains, adding that it is a capital-intensive business and if GPS were to decide to do all these projects on their own balance sheet, they would need to raise more capital. "That said, they have a good revenue visibility given their commercial and industrial-focussed client base," he says.

Chakraborty believes they have barely scratched the surface of the multi-billion dollar global biofuels industry, and his goal for the next three to five years is to help GPS remain profitable and run some of the flagship biofuels projects across the world in India.

GPS Renewables

FOUNDED IN: **2012**

FOUNDERS: **Mainak Chakraborty** (co-founder and CEO); **Sreekrishna Sankar** (co-founder and COO)

FUNDING: **$20 million;** last funding round was a Series B in **April 2022**

INVESTORS: Include **Neev Fund, Triodos Investment Management, Capsian Equity, i2India Holdings**

KEY INNOVATION: Building **tech-powered waste-to-renewable** energy infrastructure

VIKAS BABU FOR FORBES INDIA

SEA6 ENERGY

Sea of Possibilities

The startup uses automation to develop large-scale feedstock of seaweed, which has the potential to replace fossil fuels. It is now trying to make biofuels and bioplastics

India has a high dependence on crude oil; it's the third-highest importer in the world after the US and China. According to a July 25 report in the *Economic Times*, India imported \$31.4 billion worth of crude oil in the April-June quarter, about 60.1 mmt.

There is no easy alternative to the versatile crude oil, which powers our industry and energy needs, from transportation to textile, but which releases carbon dioxide that contributes to global warming.

A Bengaluru-based startup launched by a biotechnology research veteran from Biocon and three engineering graduates from the Indian Institute of Technology (IIT) Madras is contributing to the solution by farming the ocean. Sea6 Energy is developing a large-scale sustainable alternative feedstock from seaweed, which "can potentially replace everything that we do today with crude oil", says Shrikumar Suryanarayan, co-founder and managing director.

In 13 years since being founded, the startup has been working on two broad areas: First, large-scale seaweed production by developing automation, and second, converting this seaweed into useful products that have applications across sectors.

Growing seaweed—which absorbs carbon dioxide as it grows, transforming it into biomass—is traditionally a labour-intensive process restricted to shallow waters, which makes it cost-ineffective. Sea6 has been inventing and scaling up machinery to counter these issues. It has a patent on a seaweed farming system, Suryanarayan says, which includes a tractor that automates the process of seeding and harvesting. There are also large-scale girds that float on the ocean on which seaweed can be grown.

The first product made from seaweed that they have commercialised is a bio-stimulant, when sprayed in small amounts on crops like rice, maize and sugarcane can drive the yield up by 10 to 30 percent depending on the crop, the inputs (fertilisers, irrigation) etc provided and the condition in which it is grown. "This is not a fertiliser, but improves the efficiency of how plants capture sunlight and use nutrients," says Suryanarayan. "This means we have found a way to produce more food from the same land and improve food security."

Sea6 has a global patent on this product, which is exported to the US, Europe, Latin America, Japan and other countries in Southeast Asia. These bio-stimulants are manufactured in India and Indonesia, though the bulk of the seaweed farming is done in the latter where Sea6 has a fully owned subsidiary because of the advanced maritime zoning and leasing regulations.

Sea6 is on track to earn about \$10 million this financial year largely on the back of the bio-stimulant, says Suryanarayan. He adds that

Sea6 Energy

FOUNDED IN: **2010**

FOUNDERS: **Shrikumar Suryanarayan** (co-founder and MD), **Sowmya Balendiran** (co-founder and chief business officer), **Nelson Vadassery** (co-founder and chief technology officer), **Sailaja Nori** (co-founder and chief scientific officer)

FUNDING: **\$39.4 million;** last funding round Series B in **July 2022,** according to **Tracxn**

INVESTORS: **Tata Capital, BASF, Aqua Spark and Silverstrand,** apart from a handful of angel investors

KEY INNOVATION: Use **proprietary automation** to develop large-scale feedstock out of **seaweed;** develop **sustainable products** and use cases out of **seaweed,** including **bio-stimulants** for agriculture, **biofuels and bioplastics**

Shrikumar Suryanarayan, co-founder and MD of Sea6 Energy

they are working on making fuel from seaweed, and have published a paper with IIT Madras last year detailing how this can be possible. The startup, according to Tracxn, has raised a total funding of $39.4 million from investors, including Tata Capital, BASF, Aqua Spark and Silverstrand, apart from angel investors, including Biocon CMD Kiran Mazumdar-Shaw. The Series B fundraise, which got in around $18.5 million, came in July 2022.

The startup is yet to turn a profit, Suryanarayan says, because "expense on R&D is high" and the registration pathway required for commercialisation is long in different countries. "But once you get registration, sales are very rapid," he says. "The agricultural bio-stimulants are inherently profitable, and as the volumes build up, we expect to gain profitability in the next year or year and a half."

As they scale up their farm technology, they have started doing research on converting seaweed to biodegradable plastic. "Next year, we will be in a position to start rolling out some of these products, and we are positioning our next fundraising round, which is Series C, as a growth round," says Suryanarayan.

Vineet Chadha, partner, Tata Capital Innovations Fund, was one of the first to invest in Sea6 in 2015 and has been invested for the past eight years. According to him, the company has been consistently progressing and developing interesting products with seaweed, like, he says, water-soluble detergent pods, whose outer layer also dissolves as the clothes get washed.

Chadha believes that the beauty of Sea6 is the founding team's ability to innovate using simple, intuitive tools and technology and come up with large use cases and commercial applications. "They never complicate or over-engineer things. Their products, including the bio-stimulant, are testament to that. These guys think big, but simplistically. They have their science and their thought process very clear."

As an investor, the exit has taken longer than what he expected, partly because of Covid-19, Chadha says, but he is happy that they've been getting partial exits at regular intervals, one in 2020 and another in 2022. "The team is committed to give, and has been giving us liquidity, which is a good thing," he says.

SELVAPRAKASH LAKSHMANAN FOR FORBES INDIA

SMART JOULES

Powering On

The Delhi-based energy-efficiency technology startup helps businesses, particularly hospitals, optimise power consumption; the excess electricity can be redirected to places that experience shortages

Energy efficiency is the lowest-hanging fruit in climate action, says Arjun Gupta. There are solutions and technologies that exist today, which are proven, scalable and profitable.

Gupta is co-founder and CEO of Delhi-based Smart Joules, an energy-efficiency technology startup, whose innovations help commercial businesses, particularly hospitals currently, optimise their energy requirements. The startup has a little over 40 clients across 25-odd cities in India, and Gupta claims to have generated an average energy savings of about 29 to 30 percent across the portfolio, meaning a "reduced energy cost of about ₹150 crore". The startup has prevented the release of 140,000 tonnes of carbon dioxide since it was launched in 2016, Gupta claims, and his target for the decade is to reach 29 million tonnes. He had started this company with co-founders Sidhartha Gupta (also CFO) and Ujjal Majumdar (also COO).

Smart Joules offers to design new interventions or retrofit solutions for energy systems in existing structures without the business having to incur additional capital expenditure. They have started out with offering their solutions to hospitals and facilities in the health care sector, due to the latter's 24x7 nature of operations and high unit electricity costs. Apollo, Aster and Fortis, among others, are the hospitals it works with.

Alex Loizos, chief product officer, and Arjun Gupta, CEO, of Smart Joules at a chiller plant in Apollo Hospital in New Delhi

Gupta says over the years, they have collected granular data about energy consumption at the facility, systems and equipment level at hospitals, and this has been key to their ability to offer solutions without increasing capex burden of companies. For example, he says, they are working with a hospital that was traditionally designed for a cooling load of maximum 1,000 tonnes and had air conditioning systems with 1,300 tonnes of capacity. When they studied the facility, they realised that its cooling load was going to be a maximum 600 tonnes and the air conditioning capacity need not be more than 900 tonnes. "We were able to reduce 400 tonnes of capacity, purely on the basis of studying the energy consumption data."

Their DeJoule technology platform deploys Internet of Things (IoT) systems and sensors to monitor

and optimise the performance of a facility real-time. This means various energy-related functions at a facility, like fan speed controls, air supply monitoring, user comfort sensing, alerts, alarms and monitoring can happen real-time.

"We have replaced PLC [programmable logic controllers—basically industrial computers, with various inputs and outputs, used to control and monitor industrial equipment based on custom programming] technology with IoT control technology, which is more advanced in processing capacity, speed and data storage, where logics can be updated in real-time," Gupta explains. Second, software

Smart Joules

FOUNDED IN: **2016**

FOUNDERS: **Arjun Gupta** (co-founder & CEO), **Sidhartha Gupta** (co-founder & CFO), **Ujjal Majumdar** (co-founder & COO)

FUNDING: **$6.47 million;** last funding round Series A in **March 2021**

INVESTORS: **Sangam Ventures, Raintree Family Office, ADB Ventures and Max India,** among others

KEY INNOVATION: Design **new interventions or retrofit solutions** in existing structures for **energy efficiency; IoT-based** systems to monitor and optimise **performance** of a **facility real-time**

of traditional automation systems used to be stored on an on-site server, which, in the case of Smart Joules, is entirely cloud-based.

Their payment is linked to the energy saving of the facility. This is to make sure they are incentivised to minimise energy costs. So far, Smart Joules has raised a total funding of close to $6.47 million, with the last funding round being a Series A of about $4.9 million in March 2021. Investors include Sangam Ventures, Raintree Family Office, ADB Ventures and Max India.

Gupta's long-term goal is to ease the pressure off the electricity grid so that the inequity in power consumption can be corrected to whatever extent possible. "The commercial sector gets uninterrupted power, whereas many residential neighbourhoods in India continue to face power outages. The power that is not used by the commercial sector can be sold by the utility to neighbourhoods that do not get power," he says, adding that his business plan is to branch out of health care to sectors like hotels, pharmaceuticals, food and beverage, and data centres.

Since Smart Joules' revenues are directly linked with energy saved, the growth of the company is accompanied with positive environmental impact, says Mandar Gupte, CEO, Raintree Family Office, who participated in the Series A fundraise. He adds that with a long runway of growth ahead, the startup has created a niche in the hospital sector and developed stickiness with their existing client base. "They have a track record in winning multiple hospital contracts with large chains such as Apollo, which should help them win incremental businesses," says Gupte, adding that when they invested in the company in 2021, Smart Joules had about 16 projects with ₹12-13 crore of revenue. "Now they have more than doubled to about 42 projects, with revenues of ₹37 crore in FY23."

Smart Joules has been just as successful in larger facilities, as they have been in smaller ones, Gupte says, adding that revenue growth should also be accompanied by healthy return on invested capital in projects. "As the business grows, it is important to achieve operational excellence in terms of building strong teams, setting up systems and processes to be able to service different industries at scale and deliver the savings as promised," he says.

CEO Gupta, for his part, is clear about what he wants to do over the next few years: "Our strategy is to decarbonise, one company at a time," he says.

AMIT VERMA

RENKUBE

Maximising the Power of the Sun

Deeptech solar startup RenKube is developing an AI-powered light harvesting glass that helps panels gather more sunlight and redirect it to solar cells to increase energy yield


SELVAPRAKASH LAKSHMANAN FOR FORBES INDIA

(From left) Lakshmi Santhanam, Balaji Lakshmikanth Bangolae and Deepika Gopal, co-founders of RenKube, at a solar energy plant in Karnataka

While working at Cisco in Bengaluru, three engineers decided to get out of the corporate bubble to use their skills in the promising renewable energy space. They started out with a simple premise—India is still importing billions worth of oil and is not energy-secure. Being a tropical country, can we capture solar energy better? This led them to start a deep-tech solar startup called RenKube in 2017.

Balaji Lakshmikanth Bangolae, Lakshmi Santhanam and Deepika Gopal did not have a background in solar and renewable energy, and spent the first few years trying to come up with a business model.

Their first endeavour to convert heat to electricity ended in failure after they realised there was no unit economics in it. They spent another two years in research and development. "We wanted to build something that was not done anywhere else in the world," says Bangolae. They used the learning, and skills from their technology background, to develop an artificial intelligence (AI)-based software that develops the best designs to capture sunlight. Finally, they developed motion-free optical tracking (MFOT) of solar panels.

In traditional large solar farms, the panels are kept on motors and gears, and mechanical trackers help the panels move in the direction of the sun. These trackers come with an additional capex, and also need skilled manpower to maintain them. They are also viable only for huge solar farms, and not smaller residential or commercial spaces. "We have embedded this tracking capability in a completely motion-free manner using glass," explains Santhanam.

They have designed a patent-pending optics and geometry on a light-harvesting glass to capture sunlight throughout the year and send it to solar cells. "We have demonstrated that this can increase the energy yield of the panel by up to 20 percent. We are now designing to increase the yield further to 40 percent," she says. "We give the same benefits of a mechanical tracker, but in a completely motion-free manner so that you do not have the hassles associated with a tracker."

While developing this, they made sure the glass is able to redirect light without damaging the solar cells or creating hotspots on the panel, and illuminates every cell. They can retrofit this to suit specific requirements. "You give all boundary conditions and our proprietary AI software comes up with the best geometrical design of the glass," Santhanam says.

Bangolae says they are also looking to collaborate with solar panel manufacturers to help manufacture their technology. The RenKube panels will cost up to 10 percent more, but the investment can be recovered in a year or two due to the 20-40 percent increased solar yield, Bangolae says, adding that paid pilots for this technology are expected to start early next year. The use cases for these panels can be in residential and commercial buildings, as well as agri photovoltaic (PV).

RenKube

FOUNDED IN: **2017**

FOUNDERS: **Balaji Lakshmikanth Bangolae** (founder and CEO), **Lakshmi Santhanam** (co-founder, COO), **Deepika Gopal** (co-founder, researcher); **Janardhana V** (co-founder and president)

FUNDING: ₹**5 crore ($570,000);** last round was a seed funding round in **August 2022**

INVESTORS: Include **Halliburton Labs, CIIE.CO, JITO Angel Network, K4 Forum Mumbai Network**

KEY INNOVATION: **A motion-free optical tracker (MFOT)** for solar panels—an AI-powered light-harvesting glass designed with proprietary software that can increase the energy yield of the panel

The startup currently has an ongoing agri PV pilot at the Professor Jayashankar Telangana State Agricultural University (PJTSAU) in Telangana, conducted under the guidance of the AgHub Foundation. They have studied data over one crop cycle and will conduct another year of studies. In existing agri-PV set-ups in the country, when solar panels are used in an agriculture field, there is an assumed loss of crop yield of 30-40 percent, Bangolae explains. In such a setup, usually only shade-tolerant crops can be grown as these panels cause a shadow underneath. "We realised that our panels cause minimal shadow because of their design, which means we can grow tropical crops. So there is no yield loss, and the land can be used for both solar and agriculture," he says. "The light redirecting prisms on the panel also send excess sunlight that is not required by the solar panel to the ground beneath, which also helps in crop growth."

RenKube has so far raised seed funding as a mix of equity and grant money, of about ₹5 crore ($570,000), and are looking to raise Series A next year as soon as their products are commercialised. Their backers include Halliburton Labs, CIIE.CO, JITO Angel Network and K4 Forum Mumbai Network. Government grants like IISc-MSME, BIRAC, USISTEF have also been instrumental in their product development, says Bangolae.

"When we invested in them [in 2021] nobody was thinking of re-engineering on the glass side. What they were doing seemed to be disruptive in a space where nobody was thinking beyond putting up EPC [engineering, procurement, construction] power plants, data analytics or at best robots to maintain solar panels," says Chintan Antani, vice president-seed funding at CIIE. He believes that the product has bright commercialisation prospects.

According to him, the co-founders bring an outsider's lens to the renewables space and do not come with pre-conceived notions about doing business. "This makes them better at absorbing feedback. They are extremely coachable, and focussed on what they want to do. They understand that this cannot be hurried up and are cognizant of the partners they choose to bring on board."

BUYOFUEL

Green Building Blocks

There is a government push for biofuels adoption, but companies will not transition away from fossil fuels until they have a clear visibility on biofuel supply, which is currently fragmented. Buyofuel, an online B2B marketplace, wants to bridge these gaps

ARUN CHANDRABOSE FOR FORBES INDIA

Kishan Karunakaran, CEO of Buyofuel, at a wood chips factory in Perumbavoor, Kerala

Kishan Karunakaran says his entry into the biofuels space was purely coincidental.

In 2007-08, cultivation of a crop called Jatropha curcas was becoming famous in India for production of biodiesels, advocated even by former President of India Dr APJ Abdul Kalam. The grandson of a farmer, Karunakaran decided to cultivate the crop. The idea was to sell it to biofuel manufacturers, but there was no demand. They decided to get into manufacturing themselves. "I set up one of India's earliest commercial scale biodiesel plant, and ran my own manufacturing unit till 2014," he says. They had to soon shut shop for various reasons: They realised that the crop Jatropha curcas was not a viable option for biofuels, and both demand and supply was extremely fragmented. "Clients were big but the supply was small," he says.

In 2018, the Indian government launched the National Policy of Biofuels to reduce India's dependence on imports and improve local manufacturing of biofuels. This time around, Karunakaran, along with friends Venkat Selvan, Sumanth Kumar and Prasad P Nair, decided to plug the gaps across the value chain using technology and a mobile platform. "We wanted the platform to help fragmented suppliers of waste [that can be used as raw materials for biofuels] to connect with biofuel manufacturers easily, and also supply these biofuels to large fuel consumers," he says.

They launched Buyofuel in 2020, which they call India's first B2B marketplace for buying and selling both biofuels and raw materials to make biofuels.

There are three main stakeholders that Buyofuel seeks to connect: First, suppliers of waste like used cooking oil, tyre/rubber waste, agro waste, wet organic waste, saw dust and plastic waste that can be used as raw materials to make biofuels. Second, manufacturers of solid, liquid and gaseous biofuel. Third, end consumers like factories or industries that can replace their petrol, diesel and coal requirements with bio-alternatives.

Examples of solid biofuels—typically used by industrial boilers as an alternative to coal—available on the platform include loose biomass, biomass briquettes and pellets. Liquid biofuels, a prospective replacement for fossil fuels based on petroleum, on the platform include biodiesel, bio LDO (plastic oil), bio ethanol and bio-FO (tyre oil). Gaseous biofuels available on the platform include bio CNG and green hydrogen.

It is easier for companies to source fossil fuels since the supply is more consistent and organised, there is an assurance of quality, and transactions are transparent and simple, Karunakaran says, adding that Buyofuel is trying to build the same ecosystem for biofuels. "First, we want to aggregate and curate suppliers in terms of quantity. Second, offer a quality assurance. Third, being a tech platform, we want to give an end-to-end visibility from enquiry to doorstep delivery, thereby making it as easy to carry out these transactions as in the case of fossil and conventional fuels." All transactions are done online on the platform. There is no subscription fee, and revenue earned by the startup is through sales.

Buyofuel

FOUNDED IN: **2020**

FOUNDERS: **Kishan Karunakaran** (CEO), **Venkat Selvan** (CTO), **Sumanth Kumar** (CMO & CPO), **Prasad P Nair** (head of marketing)

FUNDING:Close to **$2 million;** last funding was pre-series A round in **November 2022**

INVESTORS: Include **Inflection Point Ventures, Gruhas, Venture Catalysts** and **Lets Venture**

KEY INNOVATION: An online marketplace that **connects suppliers of waste / raw materials of biofuels**, manufacturers of **biofuels and end industry consumers**

The Coimbatore-based startup works with 30 large consumers of biofuels across sectors like companies in the cement, pharmaceuticals, steel, paper, and food beverage sectors. Their clients include ITC, Aditya Birla Group, Saint Gobain, Hindustan Unilever, Cipla, Ramco Cements and Thermax.

"We are doing a monthly revenue rate of ₹7 crore, with transaction volume of about 12,000 tonnes of biofuels a month," says Karunakaran, who is the chief executive officer at Buyofuel. "We have ensured that more than 25,000 metric tonnes of carbon emissions are offset by replacement of fossil fuels by biofuels from our platform."

Buyofuel has raised a total equity funding of close to $2 million, the last funding being a pre-Series round in November 2022. Investors include Inflection Point Ventures, Gruhas, Venture Catalysts and Lets Venture.

"The challenge in biofuel adoption is supply, because despite government mandates, industry will only make the switch if they see uninterrupted supply," says Ankur Mittal, co-founder, Inflection Point Ventures (IPV). "We wanted to invest in and promote businesses that can solve for this supply problem, and it was clear for us that if Buyofuel can solve for this, their growth can be exponential."

Karunakaran has deep experience of more than 10 years of working in this space that will be helpful in solving for challenges that come with scale, adds Mittal, whose firm holds around 10 percent equity in Buyofuel. "We are now working with them to turn the business profitable, particularly at the state-level."

With 58 employees, the startup is currently present in Tamil Nadu, Karnataka, Maharashtra, Andhra Pradesh, Telangana, Punjab and NCR. Their path to profitability, Karunakaran says, includes diversifying across various types of biofuels and waste, and working more closely with the government, which is one of the largest buyers of biofuel.

"We want to become an Ebitda-positive company over the next two-three months, and in the next three to five years, we want to target at least 1 percent of India's fuel sales to be replaced by biofuels through the platform," he says.


CHAITANYA DINESH SURPUR

ESG Funds Losing Sheen in India

Despite regulatory push and improved awareness about the green economy and climate risks, investors' interest for ESG-focussed funds is waning. Such schemes are seeing net outflows and low AUMs

By **NASRIN SULTANA**

The world is leaning towards a greener and cleaner environment, but investors in India are losing interest to bet on funds focussed on environmental, social and corporate governance (ESG). This is despite widespread emphasis, awareness and concerns about ESG investing, and the government's regulatory changes to incentivise investors towards low-carbon instruments. The wake-up call post Covid-19 seems to be fading away.

After a rushed approach to ESG

mutual funds in India in 2020, those categories of funds are not only seeing consistent outflow of money, but there have been no fresh schemes which is eroding the assets under management (AUM) as well. ESG-focussed funds are steadily seeing net outflow for the last 12 months—with the highest outflow of ₹229.99 crore in June, shows a *Forbes India* analysis based on data provided by Morningstar. In the last one year ending June, ESG mutual funds lost ₹1,684.84 crore, with a net outflow of ₹891.53 crore in 2023 alone. The analysis considers nine ESG-focussed funds in India launched since 2013.

According to Rohit Shimpi, fund manager, and Priyanka Dhingra, ESG analyst, SBI Mutual Fund, ESG-based investing in India is at its 'infancy'. The category did well globally and domestically during the Covid years of 2020 and 2021.

"Subsequently ESG investing went through a challenging phase. The war in Ukraine sparked a global rally in defence stocks, the spike in energy prices renewed interest in oil and gas, and other fossil fuel companies. Traditionally, both these sectors are not part of an ESG portfolio, resulting in relative underperformance," explain Shimpi and Dhingra.

"Individual investors may not be able to appreciate what fund managers are attempting to do in the same way that they do with conventional equity funds."

Ashwin Patni
Head Products & Alternatives, Axis AMC

SBI Magnum Equity, the oldest ESG fund launched in 2013, accounts for nearly half of the overall assets of such schemes in India.

Investors' waning interest

Picture this: Fund size worth a meagre ₹2,703 crore in 2019 more than tripled to ₹9,411 crore in a year, and then rose to ₹12,369 crore in 2021, shows the analysis. However, starting 2022, AUM of ESG-focussed funds started to dwindle—to ₹10,741 crore and it further fell to ₹10,635 crore in the first six months of 2023.

The trend follows a similar script for flows. ESG -focussed funds have seen the highest outflow ever in 2022 worth ₹941.62 crore. For three consecutive years starting 2019, ESG funds continued to see net inflows peaking at ₹5,532.42 crore in 2020 when six new schemes were launched in the category. In the six months of 2023, ESG schemes have seen a net outflow of ₹891.53 crore.

Adding to the woes, there has not been a single ESG fund launch in the two years after 2021. In 2020, as investors grew conscious of climate risks, India saw six additions of ESG schemes, followed by only one the following year and none thereafter.

However, post the onset of the Ukraine/Russia conflict and the resultant rally in defence and energy stocks, there was a subdued interest in ESG funds as a category. This was coincidental to an increase in regulatory measures, primarily due to multiple greenwashing

INFOGRAPH: CS MUKESH SINGH

Fund size of ESG mutual funds in India

AUM (₹cr)

Note: Data for 2019 is July onwards, and for six months in 2023; AUM is asset under management

SOURCE Morningstar

allegations on larger global funds.

According to the Morningstar analysis, sustainable funds saw an outflow of ₹1,060 crore in the first half of 2023. While the initial fund launches attracted significant interest and flows, there aren't any continuing flows into sustainable funds after the initial fund launch period.

While still nascent, with only 11 sustainable funds, the market is concentrated as the top five funds account for 87 percent of overall fund assets, with the largest accounting for 45 percent. Currently there are eight actively managed sustainable funds, one passive ESG exchange-traded fund/fund of funds, and two global sustainable feeder funds. Active funds account for 97 percent of overall sustainable fund assets.

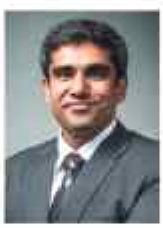
Morningstar defines sustainable funds as open-end funds, exchange-traded funds, feeder funds, and funds of funds which focus on sustainability, impact or ESG factors.

What dampened the enthusiasm?

Experts and analysts blame it on lack of awareness and teething problems of a nascent industry. "It is still early days for sustainable investing from a retail investors' perspective. Globally, too, the interest started from asset owners and managers, and then translated into retail interest in sustainable investing. Continuing awareness and focus on sustainable investing by asset managers will eventually translate into retail investor interest in sustainable investing," says Kaustubh Belapurkar, director-manager research, Morningstar India.

Ashwin Patni, head products and alternatives, Axis AMC, feels in India, ESG funds are still at a nascent stage and most retail investors don't understand how ESG translates into an actual portfolio. Therefore, one cannot expect drastic rise in flows given the limited number of schemes.

"Individual investors may not be able to appreciate what fund managers are attempting to do in the same way that they do with conventional equity funds. Different AMCs have their own individual approach. What we need is awareness and conversations around the theme, and the approach for these products. With the new norms in place, there can be multiple ESG schemes offered by AMCs," adds Patni.



"Continuing awareness and focus on sustainable investing by asset managers will eventually translate into retail investor interest in sustainable investing."

Kaustubh Belapurkar
Director-Manager Research, Morningstar India

After the Ukraine-Russia conflict and the resultant rally in defence and energy stocks, there was a subdued interest in ESG funds.

"Asset managers took a back seat to evaluate the evolving regulatory framework and the feasibility of complying with the revised regulations. EU SFDR is a classic example. To date, funds are ironing out the classification of their respective funds into article 6, 8 or 9. Closer home, Sebi [Securities and Exchange Board of India] has also tightened the disclosure norms around ESG funds," they add.

What is surprising is ESG funds are losing charm among investors despite the government's effort to make companies move towards a greener economy, creating opportunities for social-impacting causes, transiting into less climate risk environment and achieving net-zero carbon emission by 2070.

"These things take a slightly longer timeframe to play out," Patni says. As more companies begin to incorporate sustainability strategies, the more difference they will be able to make to the ecosystem... that's when the impact of ESG starts showing up to investors, he adds.

Regulatory changes: What is new?

Making further headway in climate action is not just about meeting the earlier commitments, but also entering swifter and stronger policy and regulatory change. The government and market regulator Sebi have been actively introducing slew of changes in norms for companies to become ESG-compliant to attract more investor interest.

India made its first foray into ESG regulatory frameworks and disclosures by introducing the Business Responsibility and Sustainability Reporting (BRSR) by Sebi in 2021. BRSR guidelines make it mandatory for the top 1,000 listed companies by market capitalisation to make sustainability disclosures. Later, the market regulator added a set of key indicators, also known as BRSR Core, on the top 150 companies—they are expected to provide reasonable assurance as part of their annual reports by FY24.

In July, Sebi allowed mutual funds to introduce new categories under the ESG scheme, which are spreading the net wider. Fund houses were earlier allowed only one ESG scheme under the thematic category of equity schemes.

The new categories are exclusions, integration, best-in-class and positive screening, impact investing and sustainable objectives and transition or transition-related investments.

So far, the most popular ESG strategy in India was exclusion, which means you exclude certain sectors from investments, narrowing your investment universe. Investors who have a strong belief against these sectors due to their negative connotation towards environment or society could choose these funds since there is an exclusion of such sectors.

However, fund managers are enthusiastic that Sebi's introduction of new ESG categories of schemes will open up more opportunities.

Flows in ESG funds dwindle

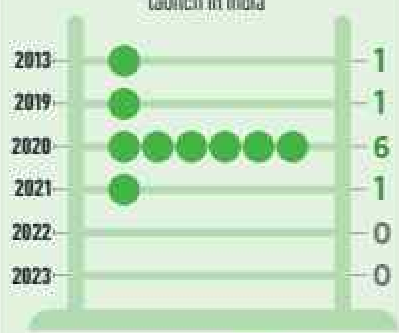
Net inflows/ outflows (₹cr)

Note: Data for 2019 is July onwards, and for six months in 2023

SOURCE Morningstar

No new ESG MFs since 2021

Number of ESG funds launch in India



SOURCE Morningstar

"With options to launch integration and best-in-class strategies, fund houses can design funds without any sectoral exclusion. For instance, a specific low carbon fund or a gender diversity fund would fall in this category. A transition category fund would be especially relevant for emerging economies like India which are undergoing a low carbon transition. These opportunities were not available in the market earlier. Investors will now have a bouquet of products to choose from," Shimpi and Dhingra add.

Currently, most of the ESG funds' holdings are heavily dominated by banking, financial services, information technology and consumer staples stocks as these companies tend to score better on ESG. "This is because fund houses face a lack of choice, and options are limited as most businesses engaged in the green economy and sustainability are not well represented on the listed market," Patni says.

Sebi has also mandated ESG schemes to invest at least 65 percent of AUM in listed entities, where assurance on the BRSR Core is undertaken. But therein lies a core issue of high concentration of funds in only large cap stocks, while mid and smaller stocks may be ignored. According to Patni, ESG compliance is not mainstream in many mid and small-sized companies in India yet, and hence the universe for the schemes is smaller and more concentrated.

The BRSR Core mandate will be required for 250 companies in FY25 and increase thereafter to cover the top 1,000 listed companies in FY27. ESG as a concept is a longer-term investment strategy and fund managers believe it will gain investor confidence as awareness of ESG products in the market grows. Unlike globally, where asset owners (investors) initiated focus on ESG aspects, in India, the thrust on ESG was initiated largely by asset managers.

"Over the longer term, we do not believe ESG funds will necessarily need to sacrifice returns relative to comparable non-ESG funds in order to achieve their objectives," Shimpi and Dhingra say.

What is surprising is ESG funds are losing charm among investors despite the government's effort to make companies move towards a greener economy, creating opportunities for social-impacting causes, transiting into less climate risk environment and achieving net-zero carbon emission by 2070."

The Green Hydrogen Gambit

The carbon-free gas has the potential to help India achieve its net zero ambitions and the government is putting its might behind it with its National Green Hydrogen Mission. But how long before we see large-scale adoption?

By VARSHA MEGHANI

Just off Bhuvanappa Layout in Bengaluru, a little known hydrogen startup with just 20 employees is attracting attention from large corporations.

Ossus Biorenewables has devised a technique that uses proprietary bioreactors to convert the organic carbon content in industrial effluents to so-called "green" hydrogen—a light, colourless gas that doesn't produce carbon dioxide when burnt.

A large steel manufacturer was the first customer. Half a kilometre away from its plant, where the steel maker's wastewater was otherwise treated and disposed, Ossus has installed its cylindrical-shaped bioreactors that draw out the organic matter from the effluents and convert it to green hydrogen. It has the twin benefit of eliminating the need to compress, store and transport hydrogen—seen as a stumbling block—besides recycling the wastewater.

Ossus currently produces 30 kg of green hydrogen per day for the steel maker from 6,000 litres of their effluent, at a fraction of the cost it paid to Linde, an Irish supplier of green hydrogen.

Ossus has since been working with companies across industries from oil

MARIJAN MURAT / PICTURE ALLIANCE VIA GETTY IMAGES

An employee at a German plant prepares a test bench for end-of-line testing of a fuel cell drive system for generating electricity from hydrogen in vehicles. The so-called fuel cell power module (FCPM) is used primarily in commercial vehicles refineries to cement makers, sugar mills to textile factories, as well as food and beverage. Nikhil Kamath's Gruhas and Rainmatter Climate are investors having put in $2.4 million in Pre-Series A funding in April.

Green hydrogen uses renewable power like solar or wind to produce hydrogen from water via electrolysis with devices called electrolysers. It's better than the more dirty "grey hydrogen" that is produced using fossil fuels like natural gas and coal. Even better is what Ossus is doing, albeit on a small scale.

"For a country where 500 million people go without access to drinking water, we don't see how it is acceptable to use 18 litres of high-quality desalinated water to produce 1 kg of hydrogen," says Suruchi Rao, co-founder and CEO, Ossus Bio.

Interest in the production of green hydrogen has grown, especially over the last year, since the government announced the National Green Hydrogen Mission in Budget 2022 with an allocation of ₹19,700 crore in order to produce five million metric tonnes of the gas by 2030. Companies big and small have been making investments to set up plants, produce new technologies and pilot projects.

Take the case of Indian Oil Corporation (IOC). The PSU has been "doing extensive research" on green hydrogen and recently announced it will set up two production units on a pilot basis in Tamil Nadu and Kerala. "We see it as the fuel of the future," said VC Ashokan, executive director and state head, IOC, at a press conference in Chennai in July.

IOC's research and development centre in Haryana's Faridabad already has an up-and-running hydrogen dispensing station—much like a petrol pump—and it has purchased 15 fuel cell electric buses from Tata Motors for undertaking pilots. Unlike regular electric vehicles (EVs) that draw on electricity from a battery, fuel cell electric vehicles (FCEVs) use a fuel cell powered by

₹8 lakh crore

Of green hydrogen investments expected by 2030, per GoI estimates. Will lead to the creation of 6 lakh jobs

50 MMT

Of carbon dioxide emissions per annum by 2030 could be avoided through use of green hydrogen, per GoI estimates

5 MMT

Planned green hydrogen production per annum by 2030, one-fifth of global production

hydrogen. Elsewhere, public sector ship builder Cochin Shipyard is experimenting with a hydrogen fuel cell-powered catamaran to take travellers on voyages across the Ganges in Varanasi.

IOC also plans to direct wind power from its wind farm project in Rajasthan to its Mathura refinery and use it to produce green hydrogen. Eventually green hydrogen will replace carbon-emitting fuels that are used in the refinery to process crude oil into value-added products such as petrol and diesel, Ashokan added.

"Currently no industries are off-taking green hydrogen," says Pranav Master, senior practice director-consulting, Crisil Market Intelligence and Analytics. However, India is prioritising green hydrogen as a potential solution to decarbonise hard-to-abate sectors such as refineries, iron and steel, cement, fertilisers and heavy-duty trucking. The last two years have seen a surge in companies unveiling pilot schemes, such as IOC's, aimed at proving the potential of the green gas to transform industry.

Reliance, for example, has embarked on a "full spectrum" green hydrogen strategy, as Morgan Stanley notes—from the manufacture of solar panels and batteries to the development of electrolysers to make green hydrogen. The Mukesh Ambani-run conglomerate has partnered with Danish clean-technology firm Stiesdal to manufacture electrolysers at its factory in Jamnagar. These devices will use clean electricity from Reliance's solar farms, which are also being built in Jamnagar, to manufacture green hydrogen.

Ambani believes these investments will make India the first country to produce green hydrogen for $1 per kilogram within a decade. It's a bullish estimate as the current cost is $3.6 to $5.8 per kg. According to Sanford C Bernstein, an American investment bank, "under $2/kg seems achievable towards the end of the decade".

"Just as India has the world's most affordable wireless broadband today, we will have the world's most affordable green energy within this decade. And these solutions will then be exported to other countries, helping them contain carbon emissions," Ambani noted in Reliance's 2021-2022 annual report.

Similarly, JSW Energy is setting up a 3,800-tonne hydrogen plant at its Vijayanagar plant with 25 megawatts of round-the-clock renewable power. The plant will be up and ready before March 2025. "It will help us decarbonise the steel-making process to produce green steel, the demand for which is strong in domestic and international markets," says Prashant Jain, joint managing director and CEO, JSW Energy.

Engineering and construction giant Larsen & Toubro (L&T) commissioned its first green hydrogen pilot plant at its Hazira complex in Gujarat in 2022. The plant has been in operation for over a year now and has been producing around 45 kg of green hydrogen daily for captive consumption. The move is integral to its ambition of achieving carbon neutrality by 2040.

L&T has plans to develop projects with capacities of 50-100 kilo-tonnes per annum of green hydrogen for direct use or conversion to derivatives like ammonia and methanol, says

Derek Shah, senior vice president and head-Green Energy Business.

Like Reliance, L&T is also eyeing the entire green hydrogen value chain. It has started building a manufacturing unit for 1 GW electrolysers and is also set to acquire land in coastal regions for building solar and wind farms that would feed into its green hydrogen facilities. "In the next five to 10 years, green hydrogen will have a significant contribution in the India energy portfolio. To start with, green hydrogen will support the refinery, fertiliser and city gas distribution sectors and eventually it will contribute to other sectors like power, steel and mobility," says Shah.

Adani New Industries (ANIL) has made the biggest splash thus far announcing that it will invest $50 billion over the next decade to produce green hydrogen and create an ecosystem around it in partnership with France's Total Energies. The Gautam Adani-run conglomerate plans to develop green hydrogen capacity of one million tonnes per annum before 2030 as part of its initial phase. Total Energies will pick up a 25 percent stake in ANIL. "This allows us to shape market demand," Adani said while announcing the deal in January 2022.

Startups like Ossus and the Poonawalla family-backed H2e Power Systems, which is building a 1,000 MW electrolyser plant, are also making a splash. As are medium-sized outfits like Hyderabad-based Greenko which has partnered with Belgium's John Cockerill to make electrolysers in India.

In all, over eight lakh crore of green hydrogen investments are expected by 2030, as per government estimates. Fifty million metric tonnes of carbon dioxide emissions per annum could be avoided through the use of green hydrogen by 2030.

Demand dynamics

The reason companies are investing in green hydrogen is because of the huge demand they foresee. India's current hydrogen demand is around six million tonnes per annum, which is expected to reach 12 million tonnes by 2030. The government expects around 40 percent of this demand to be met by green hydrogen, leading to around five million tonnes per annum of domestic demand by 2030.

"The transition [to green hydrogen] cannot happen overnight, but it will happen sooner than most people think."

Prashant Jain
Joint MD and CEO of JSW Energy

Additionally, as India is also gearing up to be a major hub for exporting green hydrogen, analysts expect an additional demand of five million tonnes from the export market by 2030.

"I would put the use cases [of green hydrogen] into three large buckets—industry, power generation and vehicles," says Mustafa Wajid, chair, IET Future of Mobility and Transport Panel. While the clean fuel has use cases across industries, adoption depends on bringing the price of green hydrogen down.

"To produce cost competitive green hydrogen, low-cost renewable energy, which accounts for 60 percent of the total cost, and water are two important resources required," says Master. Electrolysers account for 30-35 percent of the cost.

Currently the vast majority of hydrogen is produced from fossil fuels such as natural gas and coal to make what is known as "grey" hydrogen. It costs around ₹160-200/kg, according to KPMG.

Green hydrogen, by comparison, is produced using renewable energy like solar or wind energy, which is by definition intermittent. This means storage costs need to be included to ensure round-the-clock supply of renewable energy when calculating the cost of green hydrogen, which currently hovers around ₹300 per kg. "Because of the intermittent nature of renewables, green hydrogen has not been able to scale yet. The technology is still in its infancy," explains Wajid. According to International Energy Agency, green hydrogen currently accounts for a mere one percent of global hydrogen supply.

The theory, however, is that costs will fall over time as they did for offshore wind and solar power—a shift that made them much more competitive. KPMG expects green hydrogen costs to halve to ₹160-170 per kg by 2030.

Here India is at an advantage given its vast coastline (~7,500 km) with access to sea water and ample sunlight and wind, "as well as rivers, which provide a source of water for the electrolysis process," says Master. Also, India's large industrial base gives green hydrogen producers a captive market, while its proximity to key global markets and large ports gives it an advantage in the export markets.

The consumption and demand of green hydrogen are also stunted by problems relating to the storage, compression and transportation of the gas. "India lacks the necessary infrastructure such as pipelines and storage facilities to transport and store green hydrogen. The entire market and ecosystem need to be built out, as is the case with every new technology. We saw a similar pattern play out with renewables and EVs," says JSW Energy's Jain.

He adds, "The transition [to green hydrogen] cannot happen overnight, but it will happen sooner than most people think." And it may well be a historic opportunity for India to not just reduce its own emissions but also create a robust export-led industry.

Our choices matter, also for building materials: In Insulation, Not all rock wool are ROCKWOOL

Vinay Pratap Singh,
Business Unit Director – India & SAARC Countries

ROXUL ROCKWOOL Technical Insulation India Pvt. Ltd., elucidates on how ROCKWOOL stone wool product make buildings more energy efficient, safer from fire, healthier, and more comfortable to be in.

Fire safe. Circular. Durable. Moisture resistant. Sound absorbent. Breathable.

These are the natural properties found in all ROCKWOOL stone wool insulation. Our products make buildings more energy efficient, safer from fire, healthier, and more comfortable to be in. And since your choice of building materials today shouldn't negatively impact tomorrow, we take care of that too.

Whatever happens to the building in its next phase of life, our natural insulation products can easily be reused or recycled and pose no risk of negative health or environmental impacts for future generations.

Not all building materials are created equal. **Ours are created by nature.**

ROCKWOOL Products are Fire safe by Nature: Naturally fire resilient, ROCKWOOL Stone Wool meet the strictest requirements for structural fire safety and offer optimum protection for occupants – and with no added chemical flame retardants needed, they are also kind to the environment. Capable of withstanding temperatures of over 1000°C, the stone wool in the construction helps contain fire and prevent its spread.

ROCKWOOL Products are Circular by Nature: Based on one of the most abundant raw materials on the planet, ROCKWOOL stone wool is circular by nature. Although stone is in plentiful supply, it's still important to make better use of natural resources – especially when it comes to the building sector that produces a third of all waste, much of which ends up in landfill today. ROCKWOOL stone wool is recyclable and long-lasting, even using waste from other industries as an alternative raw material. Stone wool products can be easily removed when a building is renovated or demolished, and recycled back into new products – without ever losing performance.

ROCKWOOL Products are Durable by Nature: Its thermal performance is unaffected by weather, humidity, temperature changes or compression – and needs no technical supervision or maintenance throughout the building's lifetime. It is also resistant to both corrosion and mould. Sample testing from existing buildings shows that ROCKWOOL stone wool retains its performance for 55 years – and counting! As its thermal performance remains constant over time, just imagine how much energy can be saved throughout the lifetime of the building.

ROCKWOOL Products are Moisture Resistance by Nature: Stone wool helps play an active role in protecting buildings from rainfall and humidity. When it comes to handling moisture, stone wool resists water by nature, just like the stone it's formed of. During wet and rainy weather, stone wool insulation keeps buildings warm and dry without any reduction in thermal performance over time. It also resists moisture in humid climates, protecting the long-term health of buildings and the people within them.

ROCKWOOL Products are Breathable by Nature: As well as maintaining the optimal temperature, ROCKWOOL stone wool insulation is breathable by nature. So architects can create buildings that not only shelter us from the weather, but also provide a safe and comfortable indoor environment that empowers us to lead healthy lives. The breathable nature of stone wool insulation also contributes to securing healthy, comfortable indoor environments that are cool in the summer and warm in the winter. But that's not all. Buildings, like people, need to stay healthy. Stone wool is vapour-permeable, which means it allows moisture to pass through walls and out of the building. This protects buildings against rot, mould and humidity damage.

ROCKWOOL Products are Sound absorbent by nature: ROCKWOOL stone wool is sound absorbent by nature. Its' high-density makes it extremely resistant to airflow, reducing the ability of noise to travel.

Not all rock wool are ROCKWOOL. Let's Talk about our Brand.

The ROCKWOOL brand is known all over the world today as providing the highest quality stone wool solutions that offers consistent and lasting performance in fire, thermal and acoustics among others.

Our symbol is based on the element that unites all the ROCKWOOL product lines: volcanic stone. Reflecting ROCKWOOL synergy in offering advanced stone wool innovations that address local and global issues surrounding sustainability and development - a graphic representation of a volcano that demonstrates to stakeholders and customers how ROCKWOOL brands use the natural power of volcanic stone to enrich and transform modern living, while providing solutions with far-reaching benefits. A volcano represents our process and our interdependent relationship with nature.

Sometimes all it takes is a closer look.

So, the next time you're working with the world's bestselling brand of stone wool, go ahead and call us by our name. ROCKWOOL stone wool insulation. We're one of a kind.

Fortified by over 80 years since the ROCKWOOL Group started production of stone wool insulation, we are the world leader in this field, with more than 12,000+ passionate colleagues spread across 39 countries throughout the Group. And since then throughout our history, our people have been innovating and discovering ways to transform an abundant, renewable natural resource into materials that bring comfort, safety and sustainability to millions of people worldwide. At the pinnacle of ROCKWOOL's strategy is our corporate Purpose: to release the natural power of stone to enrich modern living. This reflects our Purpose's unifying nature, conveying that stone is our core raw material and the bedrock on which our business is based.

GDP & Jobs: Warning Bells

Rising temperature, climate change risks, plastic pollution and high carbon emission not only impact lives and jobs, but also commodity prices, especially food. Is India prepared to commit more investment towards a green economy?

By NASRIN SULTANA

CHAITANYA DINESH SURPUR

With change in climate threatening sustainability of life, livelihood and the ecosystem, economists and policymakers worldwide are sharpening their focus on mitigating such risks. However, it is a rather steep task, as India is among the top 10 economies in terms of vulnerability to climate risk events and is already suffering the adverse impact of climate change.

As India continues to face climate-related crisis like extreme heat temperature, scanty monsoon, floods and rising sea levels, the impact on overall macro and social environment is likely to be immense. The Reserve Bank of India (RBI) estimates up to 4.5 percent of India's GDP could be at risk by 2030, due to lost labour hours from extreme heat and humidity.

Climate change due to rising temperature and changing patterns of monsoon rainfall in India could cost the Indian economy 2.8 percent of its GDP and depress the living standards of nearly half of its population by 2050, RBI's Department of Economic and Policy Research (DEPR) says in its latest report on Currency &

India may lose anywhere around 3 to 10 percent of its GDP annually by 2100 due to climate change in the absence of adequate mitigation policies

Finance 2022-23. India may lose anywhere around 3 to 10 percent of its GDP annually by 2100 due to climate change in the absence of adequate mitigation policies.

The warning signs look scary. Indian agriculture (along with construction activity) as well as industry are particularly vulnerable to labour productivity losses caused by heat-related stresses. India may account for 34 million of the projected 80 million global job losses from heat stress associated productivity decline by 2030, according to World Bank estimates.

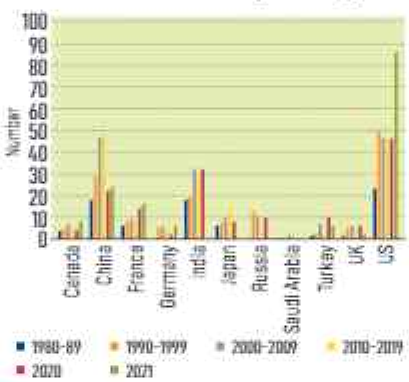
Statistics show India's growing risk with dangers of rising global warming, higher carbon emission and plastic pollution. In 2019 alone, India lost nearly $69 billion due to climate-related events, which is in sharp contrast to $79.5 billion lost over 1998-2017. Floods in India during 2019 affected nearly 14 states causing displacement of around 1.8 million people and 1,800 deaths. Overall, around 12 million people were impacted by the intense rainfall during the monsoon season in 2019 with the economic loss estimated to be around $10 billion.

However, climate change is not an Indian phenomenon alone. According to the World Meteorological Organisation (WMO), the period 2015-22 is the warmest on record. Despite the cooling effects of La Nina into its third year, 2022 was the eighth consecutive year in which annual global temperature reached at least 1 degree Celsius above pre-Industrial Revolution levels, fuelled by ever-rising greenhouse gas (GHG) concentrations and accumulated heat.

India faced its hottest February in 2023 since record-keeping began in 1901, according to India Meteorological Department (IMD) data. In March, large parts of the country experienced hailstorms and torrents of unseasonal rain, leading to apprehensions of extensive damage to standing crops.

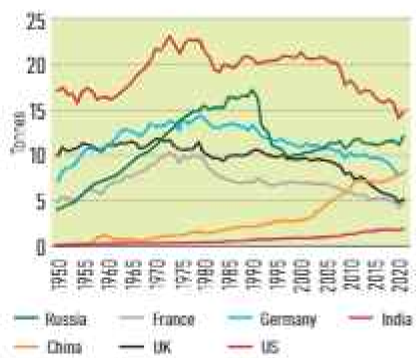
"Preserving food and energy security amidst extreme climatic events while obtaining access to technology and critical raw materials required for successful green transition will, therefore, remain a key policy challenge for India," says

Climate change-related disaster frequency



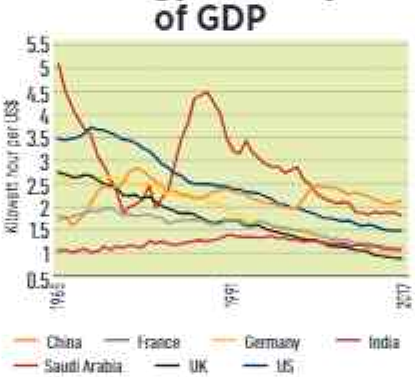
SOURCE IMF and DEPR (RBI)

Per capita carbon dioxide emissions



SOURCE OWID

Energy intensity of GDP



SOURCE OWID

Shaktikanta Das, governor, RBI.

With various policy approaches, like incentivising green financing, introducing green bonds and creating a market for carbon credits, the RBI and the financial sector regulators have increasingly focussed on risks to financial stability from climate change.

However, estimates suggest that annual green financing requirement could be about 2.5 percent of the GDP to address the infrastructure gap caused by climate events, which could increase if faster carbon emission reducing goal has to be pursued than what is committed under the NDC.

Nationally determined contributions or NDCs are at the heart of the Paris Agreement, embodying efforts by each country to reduce national emissions and adapt to the impacts of climate change.

In line with the target of net zero carbon emissions by 2070, India's NDC aims at raising the share of renewable energy and reducing the carbon emissions intensity of GDP by 2030. India presented its Long-Term Low Emission Development Strategy at the COP27, covering plans for the expansion of green hydrogen production, electrolyser manufacturing capacity and increased use of biofuels.

"The real challenge for India will be in arranging new investment, estimated to be in the range of $7.2 trillion (baseline scenario) to $12.1 trillion (accelerated scenario) till 2050," the RBI's DEPR says.

The cumulative total expenditure for adapting to climate change in India is estimated to be ₹85.6 lakh crore (at 2011-12 prices) by 2030, according to projections by the ministry of environment, forest and climate change.

Climate hitting food inflation

India has seen a hike in food inflation as significant temporal rise, scanty and unseasonal rainfalls have caused crop damages leading to higher food inflation and its volatility.

Risks due to climate change in India

Thar Desert
Heatwaves

Great Himalayas
Landslides
Cloudbursts
Melting of glaciers

Indo-Gangetic Plains
River floods
Heatwaves
Thunderstorms

Coastal Plains and Ghats
Heavy precipitation
Urban floods
Cyclones
Landslides

Central Peninsular Plateau
Heatwaves
Forest fires
Droughts

SOURCE: DEPR (RBI) Note: Map not to scale

Perishable vegetables like tomato, onion and potato (TOP) are more exposed to extreme weather events, such as cyclones and unseasonal rainfall during the post-monsoon period. Economists' estimates show that usually it is the combination of TOP prices that move in tandem and price volatility in these three key items impact food inflation.

Scanty rainfall has already had its impact on TOP prices so far in India. Prices of tomato jumped 233 percent from ₹33 per kg in June to ₹110 per kg in July. Compared to last July, tomato prices rose by 200 percent. As per the department of consumer affairs data, the average retail price of tomato in June was at ₹32.6 per kg, whereas wholesale price was at ₹24.9 per kg. Similarly, prices of potato and onion, which are key in Indian cooking, also surged 16 percent and 9 percent, respectively, in July from a month earlier. Chilli cost 69 percent more in July while cumin prices also rose by 16 percent.

The cumulative total expenditure for adapting to climate change in India is estimated to be ₹85.6 lakh crore (at 2011-12 prices) by 2030

However, these are not exceptional rise in TOP prices. Inflation in onion prices shot up to 327 percent in December 2019 led by unseasonal rains; potato prices by 107 percent in November 2020 due to unseasonal rains; and tomato prices by 158 percent in June 2022 due to heatwave and cyclone.

According to economists at Nomura, the rise in commodity prices, especially in food prices, is worldwide and mostly driven by supply issues and not demand. A supply-driven surge in commodity prices can have more serious stagflationary consequences, for not only does it add to retail inflation but also weakens growth, as, in the absence of strengthening demand, dearer food and energy erodes household purchasing power and corporate profits, explains Nomura.

"The single-most important factor has been extreme heatwaves around the world—the average global temperature made July the hottest month on record—that is hampering agricultural production. Meteorologists are warning of a severe El Niño event, as central and eastern Pacific sea surface temperatures are exceeding El Niño thresholds, and their international climate model forecasts indicate further warming is likely until at least the end of the year," says Nomura.

India is a net exporter of food, but

it remains vulnerable to spillover effects from higher global food prices and is exposed to rising oil prices, since it imports more than 80 percent of its crude oil needs.

In the case of food, India is largely self-sufficient in cereals but dependent upon imported edible oil. "With growing concerns over developing El Niño conditions, the spillover effects from global food prices to local food inflation could be higher. Already, India is facing upward pressures from an unseasonal rise in vegetable prices, and a sustained rise in global food prices could result in higher inflation and wider twin deficits, due to fiscal subsidies, higher imports and export restrictions," Nomura explains.

Are Indian companies ready?

Indian companies are gearing up to face climate risks but are not there yet. According to Deloitte India's ESG preparedness survey, merely 27 percent Indian organisations feel adequately equipped to meet their environmental social corporate governance (ESG) strategy and compliance requirements as it reveals a significant gap in preparedness and action.

The survey conducted by Deloitte Touche Tohmatsu India LLP (Deloitte India) was rolled out to 150 organisations (with over 70 percent of them listed in Indian stock exchange) to assess their readiness for ESG requirements (policies, regulations, disclosures, and compliances) and evaluate their ESG strategies and efforts. Over 70 percent of these organisations are also listed on the Indian stock exchanges.

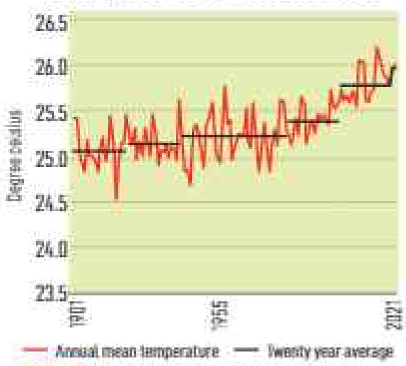
"Organisations are grappling with evolving expectations on ESG compliance and disclosure from investors, boards, governments, and consumers. They need to account for emerging global regulations on sustainable finance, climate disclosures, biodiversity, and social and governance dimensions,

With various policy approaches, the RBI and the financial sector regulators have increasingly focussed on risks to financial stability from climate change

including gender diversity and living wages, within a couple of years," says Viral Thakker, partner and sustainability leader, Deloitte India.

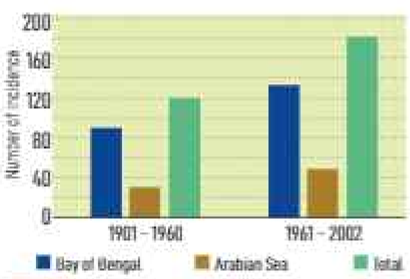
From a sector-specific perspective, consumer industry was found to lag, with only 7 percent organisations indicating robust preparedness for ESG requirements. Nearly 80 percent organisations in the energy, resources, and industrials (ER&I),

Average annual temperature in India



SOURCE: Data.gov.in; and India Meteorological Department (IMD)

Frequency of cyclonic storms in India



SOURCE: IMD

financial services, and life sciences and health care industries (LSHC) were categorised as either well-prepared or moderately prepared to meet ESG requirements.

Plastic pollution

According to the Organisation for Economic Co-operation and Development (OECD), the world utilises approximately 450 million metric tonnes of plastic a year, approximately 57 kg per person. Each year, more than 350 million metric tonnes of plastic become plastic waste, of which approximately 80 million metric tonnes become mismanaged plastic waste, also termed plastic pollution.

"This plastic pollution is estimated to come at a significant social and environmental cost—at least $300 billion per annum, and, according to certain estimates, as high as 41,500 billion per annum," says Credit Suisse research institute.

It adds that, over the past 60 years, the plastic usage intensity of GDP has dominated both the growth in population and GDP per capita. For every dollar of GDP added to the global economy, the data suggest that an increasing amount of plastic was required. With the highest population, both India and China account for a significant portion of mismanaged plastic waste. "Of the current 80 million metric tonnes of annual mismanaged plastic waste, almost 90 percent originates from non-OECD countries, with China and India contributing 22 percent and 11 percent to the global total, respectively," says Credit Suisse research institute.

It believes the negotiations for a global plastics treaty initiated by the United Nations Environment Assembly have the potential to be the most significant sustainability-focussed multilateral proposal since the Paris Agreement in 2015.

Growing Up

Hydroponic farming in India is coming of age with large-scale ventures that use efficient and indigenised technology, and claim to be profitable. The sector is also attracting investor interest

By JASODHARA BANERJEE

"When you think of Rajasthan, you will probably imagine sand dunes, camels and women carrying pots of water over long distances. This year, it has been raining very heavily for the last two months, and the last two weeks have been the worst," says Tusshar Aggarwal, co-founder of Rise Hydroponics, during a conversation in early August. "Climate change is real."

That the monsoon this year has been unusual in its onset, severity and distribution has been in the news, given the severe damage to life, property and infrastructure it has caused in the northern and northwestern regions of the country, while falling short of normal in the eastern regions. In the short term, erratic rainfall affects the sowing of crops and consequent prices of food commodities, and in the longer term, it raises the question of food security.

And it is not just rainfall that is at play: Extreme temperatures pose an equal threat. In a report titled Statement on Climate of India during 2022, India's Ministry of Earth Sciences and India Meteorological Department (IMD) highlight in detail the extreme heat conditions affecting the country *(see box)* in the pre-monsoon months. The report concludes: "Anomalously high temperatures during these months adversely affected grain filling and caused early senescence, thus reducing crop yields, especially wheat."

In a country where agriculture and allied sectors, according to the government, contributed 18.3 percent of GDP in 2022-23, and the farm sector employed 45.5 percent of its labour force in 2021-22, the impact of climate change on food security and employment cannot be stressed enough. In order to adapt to unpredictable weather and soil conditions, the agriculture sector is witnessing the growth of ventures that are adopting various technologies to mitigate the impact of erratic rainfall and heat, while increasing yield manifold *(see box)* and decreasing the use of harmful chemicals.

As entrepreneurs implement various controlled-environment agriculture (CEA) technologies, including hydroponic, vertical farming, nutrient film technique (NFT), Internet of Things (IoT) and polyhouses, investors too are showing increased interest and

"While nearby farmers would get an average yield of 60 to 70 tonnes per acre, we were able to achieve 120 tonnes per acre."

Sanket Mehta
Co-Founder, NutriFresh

involvement in the sector. It is also true that while all investors are not yet convinced about the scalability and profitability of CEA ventures, for others these ventures fulfil their environment, social and governance (ESG) investing criteria.

The new-age farmers

For ventures such as NutriFresh Farm Tech, Rise Hydroponics and CityGreens, the founders got their hands dirty experimenting with different technologies and formats before launching commercial ventures.

Sanket Mehta and Ganesh Nikam, co-founders of NutriFresh, spent about a year and a half farming on 4 acres of land that belonged to Nikam's father—Mehta was a credit officer at Central Bank of India processing proposals for loans in the agriculture sector, while Nikam was running his own debt syndication business when they met at work—and understanding the pain points and resolving them. "During that journey, while nearby farmers would get an average yield of 60 to 70 tonnes per acre, we were able to achieve 120 tonnes per acre. And that is what gave us the confidence that, when done differently and with

Nutrifresh Farms co-founder & CEO Sanket Mehta and co-founder Ganesh Nikam at Nutrifresh farms, Pune

SWAPNIL SAKHARE FOR FORBES INDIA

a little bit of knowledge, the outcome can be completely different and you can be successful," says Mehta.

The duo's first venture was of floriculture, where they grew flowers such as roses, gerbera and orchids on 4 acres; at present, this project runs completely on hydroponics. Their second project was in Phaltan, in Maharashtra's Satara district, where they leased 250 acres from the state government, and grew sugarcane, baby corn, sweet corn, maize, jalapenos, chillies, watermelon and papaya and sold them to various corporates.

Their third project was NutriFresh—started in 2019 on 10 acres—built with the learnings from the first two projects. "We learnt that we need a sector within agriculture that is tech-based, agile, and which can yield produce around the year, irrespective of the season." The company now has 33 acres under hydroponic production and grows 40 kinds of fruits and vegetables, and has more than 100 B2B clients, including Nature's Basket, Big Basket, Swiggy, KisanKonnect, McDonald's, Venky's, Amazon Fresh and Reliance Fresh.

Last May, Nutrifresh raised $5 million in a pre-Series seed funding round led by Theodore Cleary (Archer Investments), Sandiip Bhammer (Green Frontier Capital), Sky Kurtz (Pure Harvest AE) and Mathew Cyriac (Florintree Advisors and ex-Blackstone India), among others.

Ahmedabad-based Rise Hydroponics—co-founded by Aggarwal, Meet Patel and Vivek Shukla—however, remains entirely bootstrapped, with no external investor. Unlike the end-to-end approach of NutriFresh, Rise sets up large-scale hydroponic and CEA farms for other companies to operate, and has so far set up 25 lakh sq ft of hydroponic farms across 12 states in India, which includes a 200-acre farm in Rajasthan and 40 acres of poly houses.


Gaurav Narang, co-founder and CEO, CityGreens

"Our farms grow everything from leafy greens such as exotic varieties of lettuces and herbs, broccoli and peppers, to Indian staples like brinjals, okra, and melons, to ayurvedic herbs such as ashwagandha and kalmeg," says Aggarwal, who went through two years of self-learning, by trying out different techniques on rooftops. He started Rise Hydroponics in April 2020, with multiple intentions: "I wanted to make agriculture a lucrative business for everyone and change the status quo that we have seen for many years, with farmers facing severe hardships in many regions. I also wanted to change the fact that the rampant use of chemicals and pesticides was giving rise to chronic diseases, not just among consumers, but also among farmers themselves, as we have seen in Punjab."

Aggarwal explains that the cost of setting up a CEA farm can vary widely, and depends entirely on the kind of technologies and structures being implemented *(see box)*; costs can range from ₹25 lakh to ₹30 lakh for 500 sq m to 1,500 sq m. "For an investor—and a lot of private investors, including individual businesses are showing interest in this sector—the returns on investment vary from 30 to 35 percent annually, following a gestation period of two to four months."

Rise Hydroponics is a vendor for Big Basket, Star Bazaar and Waycool, and its clients include Hero MotoCorp, Indian Farmers Fertiliser Cooperative Limited (Iffco), Tatva Greens, Satvik Greens, WaterCress Farms and Satviki Farms.

Starting with the intention of providing supply linkages between growers and consumers of healthy produce, CityGreens—co-founded by Gaurav Narang, along with wife Shwaita Uniyal, and Rahul Indorkar—has worked with different models before deciding to focus on developing and deploying cutting-edge technology at affordable rates to farmers. "We had an earlier startup in the health care domain for about nine years, which was acquired by Portea Medical. With our experience in cold chains and delivery capabilities, we wanted to form a supply chain company for healthy farm produce, but realised it was difficult to find quality food," says Narang. "We started looking for other solutions and came upon hydroponics, and thought of giving it a couple of years to develop this ecosystem. So, we put in our own money and started CityGreens in 2017."

In 2020, CityGreens ventured into the B2B sector, where it started setting up farms for commercial growers; it has set up about 30 farms so far. To address the twin challenges of lack of skilled manpower and the lack of markets, it turned to creating automation solutions for all critical tasks, and tying up with players such as Big Basket and Milk Basket to provide a market to growers.

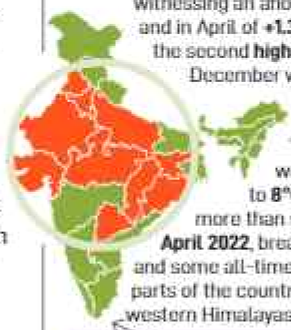
"In India, adoption of automation is very slow because the technology usually comes from the US and Israel, and is very expensive. Two years ago, we started making automation solutions and launched the automation products about eight months ago," says Narang. "Although we were operating six to seven of our own farms, we have now shut them all down. We realised we can bring in many more efficiencies with the kind of technology we have developed at an Indian price point. Compared to Israeli technology, we are at 20 percent of their cost."

Bengaluru-based CityGreens is now setting up a 3.25-acre research farm near Ahmedabad, with 12 different micro-climates for Indian crops. The technologies they thus develop will be deployed with their partner farmers. "The farm also runs entirely on renewable energy, which is another cost factor. We are using geo-thermal cooling, in which we use the deeper layers of soil to cool the air by 8-10 °C, which is then used to cool the polyhouses. For further cooling we use solar power."

Vihari Kanukollu, CEO and co-founder of UrbanKisaan, which was started in 2017 and operates greenhouses and vertical indoor farms in Hyderabad, Oman, Bahamas and Maldives and soon in the UAE and Saudia Arabia, says that although embarking on a hydroponic venture is exciting, it is not without its challenges. "Initial setup costs can be substantial, given the advanced systems and technology involved. There's also a steep learning curve, as managing a hydroponic farm demands specialised expertise. Energy consumption, especially with artificial lighting, can be significant."

Feeling the heat

According to the India **Meteorological Department**, temperatures in the pre-monsoon period of **2022** were "exceptionally hot", with the **March-May** period experiencing an anomaly of **+1.06 °C**. On an average, monthly mean temperatures in **2022** were above normal for **10 months** of the year, with the all-India mean temperature in March witnessing an anomaly of **+1.61 °C** and in April of **+1.36 °C**—these were the second **highest** since **1901**—and December with an anomaly of **+1 °C**, which was the **highest** since **1901**. The temperatures were consistently **3°C** to **8°C** above normal for more than six days in **March** and **April 2022**, breaking many decadal and some all-time records in several parts of the country, including the western Himalayas, the plains of **Punjab**, **Haryana**, **Delhi**, **Rajasthan** and **Uttar Pradesh**. The states of **Odisha**, **Madhya Pradesh**, **Gujarat**, **Chhattisgarh**, **Telangana** and **Jharkhand** experienced heatwaves, with temperatures ranging from **40°C** to **44°C** towards the end of **March**. By **April 29**, almost **70 percent** of India was affected by the heatwave, which extended to the coastal areas and eastern parts of India.



Kanukollu, Sairam Palicherla and Sampath Vinay, founded UrbanKisan to mitigate the environmental impact of traditional farming methods and the pressing need for food security in regions with land and water constraints or unfavourable farming conditions. This, while creating a sustainable and scalable solution.

Investor interest

Incofin, a Belgium-based impact investment manager that has a presence in India, recently launched its Sebi-registered ₹600-crore private equity fund, with the objective to support sustainable businesses contributing to 12 of the 17 Sustainable Development Goals. It is investing predominantly in two sectors, financial services and agri-food. "We are an impact fund, and given one of the sectors is agri-food, hydroponics, which is under a larger scheme of protected farming, fits into our thesis," says Shubham Kothari, investment associate at Incofin. "From an environment point of view, hydroponics is a more sustainable, scientific method of farming—especially in these days, given the lack of agricultural land, fertile soil, and scarcity of water—using significantly lower amounts of water, making optimal use of land, with yields that are significantly high. Also, the output is relatively clean."

Incofin's fund has a ₹500-crore investable corpus. "Typically, we do five deals per sector. The fund has been closely tracking the hydroponics sector and is hopeful of making an investment in this space, either from its current fund or upcoming funds. In general, the fund expects a minimum IRR ranging from 25 to 30 percent," says Kothari.

Kothari says there are multiple business models in the sector, including companies that just construct polyhouses or hydroponic farms and sell them to farmers, and those that are doing an end-to-end process of setting up their own polyhouses, farming, and supplying to end business-business (B2B) or business-to-consumer (B2C) customers. "We prefer models with an integrated end-to-end value chain, with the right distribution strategy as these have the potential to generate higher margins. It is also important to have a diverse product offering with an optimal blend of exotic crops, leafy greens, and traditional crops. Otherwise, it could be very difficult to be

Vihari Kanukollu (left) and Sairam Reddy Palicherla of UrbanKissan

financially sustainable," he says.

The two challenges that face this sector, he explains, are scalability and profitability. "It is important for us to have companies that are in the end-to-end business cycle of the entire hydroponic space." Although Incofin is yet to invest in any hydroponic venture, it is looking out.

An end-to-end operation is something that Karan Goshar, partner and co-founder of Samarthya Investment Advisors, also preferred and hence became NutriFresh's first angel investor. "For most investors in the agritech sector, the technology element needs to be very dominant. So, the various funding rounds taking place are related to some specific problem, which some specific company is solving," he says, adding that ESG factors, too, play a significant role in influencing decision-making. "The scope that NutriFresh holds is different. Compared to many other companies, Sanket and Ganesh entered the industry with a multi-crop approach—they have 40 SKUs—were extremely price-sensitive, and from day one they wanted to be profitable and sell the entire produce at mandi prices." Macro factors such as substantial growth in the B2B model, modern and quick commerce also proved favourable where taking the produce to market is concerned.

"NutriFresh is a very asset-heavy company, and while raising Series A we realised that although PEs are looking at this sector, VCs aren't willing to touch this asset class because of the asset-heavy nature. However, the business needs to have these assets in order to produce successfully," explains Goshar. With the fresh round of funding, NutriFresh plans to expand its total capacity to close to 100 acres in one specific location, which gives them the operating leverage.

Validating Goshar's views on VCs' approach towards the sector is Reihem Roy, partner at Omnivore, an early-stage VC fund that has invested in about 40 agritech startups, but none that involves CEA farms.

"From the investor standpoint, the challenges are two-fold: It is not so much as op-ex but cap-ex to get the farm up and running," he says. "Multiple models, such as franchise models and consumer models, have been explored. But the problem of capex remains. This is different from the asset-light, easy-to-replicate and scalable ventures that VCs like to invest in. Hydroponic farming includes real estate, machinery and equipment."

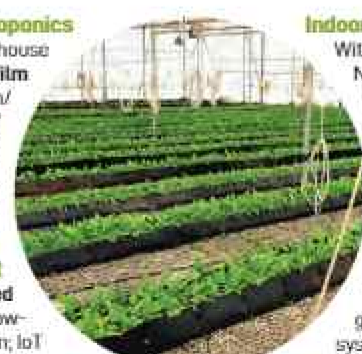
Roy explains that the second challenge that VCs face is the need for such farming ventures to aggregate demand, either by feeding into modern retail or plugging into a hyperlocal delivery platform. "The only approach that can maximise profits is the D2C [direct-to-consumer] route, but there too marketing and customer acquisition is a high cost." He adds that the VC fund would perhaps be more interested in agri-startups that are like aggregator platforms that provide market linkages or resolve specific pain points using technology.

The startups that Omnivore has invested in includes Ecozen Solutions (a solar cold storage solution), Aquaconnect (a tech platfor.m that

Systems and structures of controlled-environment agriculture

Outdoor hydroponics
With fan and pad polyhouse structure; **nutrient film technique (NFT)** system/ **Dutch bucket** system/ **deep water culture (DWC)** system; **Internet of Things** (IoT) automation

Indoor hydroponics
With **vertical metal stand**; NFT system; **grow lights**; **IoT automation**; **auto-doser** units



NVPH grow-bag/grow-slab with cocopeat
With **naturally ventilated polyhouse**; structure grow-bag/grow-slab system; IoT automation; auto-fertigation unit

Net-house grow-bag/grow-slab with cocopeat
With **net house structure**; grow-bag/grow-slab system; IoT automation; auto-fertigation unit

SOURCE Rise Hydroponics

Increase in yield using hydroponics: The case of cucumbers

3,000–3,500
No. of plants on 1 acre, using open field farming method

12,000
A 4x increase in the number of plants simply by providing vertical support to the plants

60–70%
Increase in yield by using hydroponic method of irrigation

30%
Increase in yield by using automation systems

6–7x
Total increase in output using hydroponic techniques compared to open field farming

SOURCE CityGreens

uses artificial intelligence and satellite remote sensing to bring transparency and efficient market linkages in the aquaculture sector), Loopworm (an agri-biotechnology company that converts organic wastes into valuable products), Niqo Robotics (it uses AI-powered robots in farming activities), Tractor Junction (a digital marketplace to buy, sell, finance, insure and service farm equipment) and Varaha (it generates carbon credits through tech solutions).

Kanukollu of UrbanKissan, however, has tasted success with VC investors. Although he does not reveal the amount of investments the venture has attracted, he says his investors include Y Combinator, BASF Venture Capital, 2xN and Khimji Ramdas. Markus Solibieda, managing director of BASF Venture Capital GmbH, had reportedly said that agritech was one of the key focus areas of the VC fund across the globe, and its aim is to support innovative agricultural and food-related businesses across Asia.

CityGreen initially remained bootstrapped because the co-founders believed that unless they could solve the problems, there was no point in raising money. "We did a small angel investment round, and now we feel we have cracked the market and are raising a Series A round," says Narang. "About three years ago, we had reached out to some top-rung investors and understood that they perceived hydroponics as a niche market. The middle rung was sitting on the sidelines, while the bottom rung was willing to invest. We are now talking to a US-based investor with a fund size of $75 million, which means the middle rung is coming in."

The venture is now seeing more interest from investors since it started focusing on developing technology, especially from countries such as the Gulf Cooperation Council nations and Singapore, where there is scarcity of land and water, and such cheaper technologies are in demand. "Now these investors are approaching us, instead of us approaching them," adds Narang.

The path to profitability

Although perceived as a capital-intensive, niche segment, these hydroponic farming ventures have managed to break into the mainstream by scaling up their operations, reducing the cost of equipment through indigenisation, bringing in operational efficiencies by using a bouquet of technologies, and growing a multitude of everyday fruits and vegetables instead of only exotic ones.

"NutriFresh's entire approach was about having these massive facilities in one location, so that they're able to achieve operational efficiency. Second, what really interested us in this investment was that they were growing 40 SKUs and wanted to give a bouquet of products to the customer," says Goshar of Samarthya Investment Advisors. "Usually, when you think about hydroponics, it's always about exotic fruits and vegetables. But NutriFresh doesn't do that; they do the exotics, but at the same time they're able to give every single produce that a household needs on a day-to-day basis. This has helped them in being price competitive."

"By increasing the scale of operations, we have reduced the cost by bringing in efficiencies. Apart from that, we have reduced the capex by making the required equipment in India instead of importing them, as was the case some years ago, since hydroponics was a technology that was developed in Israel," adds Nikam of NutriFresh.

UrbanKissan's Kanukollu adds the venture is expected to become profitable by the end of this financial year. "Our focus remains on sustainable growth and creating long-term value for our stakeholders," he adds. UrbanKissan has also entered into strategic collaborations, such as a joint venture with Chirayu Khimji, director of Nailesh Khimji Investments in Oman and the UAE, through which it aims to take their technology to businesses worldwide.

CityGreens—which turned profitable six months ago—is clear that if hydroponics has to be sustainable in India, it has to grow produce that people in India eat, and sell it at a price that people in India can afford. Says Narang: "Around four years ago, in my farm in Bengaluru, I was growing lettuce and selling it at ₹160 a kg. My growing cost was about ₹50-55 a kg, and I was making good money. The moment the season turned, and a truck could come overnight from Ooty, I was not able to sell even at ₹60 a kg. Demand for exotic vegetables alone is limited, and is not sustainable." F

A Solar Push for Women

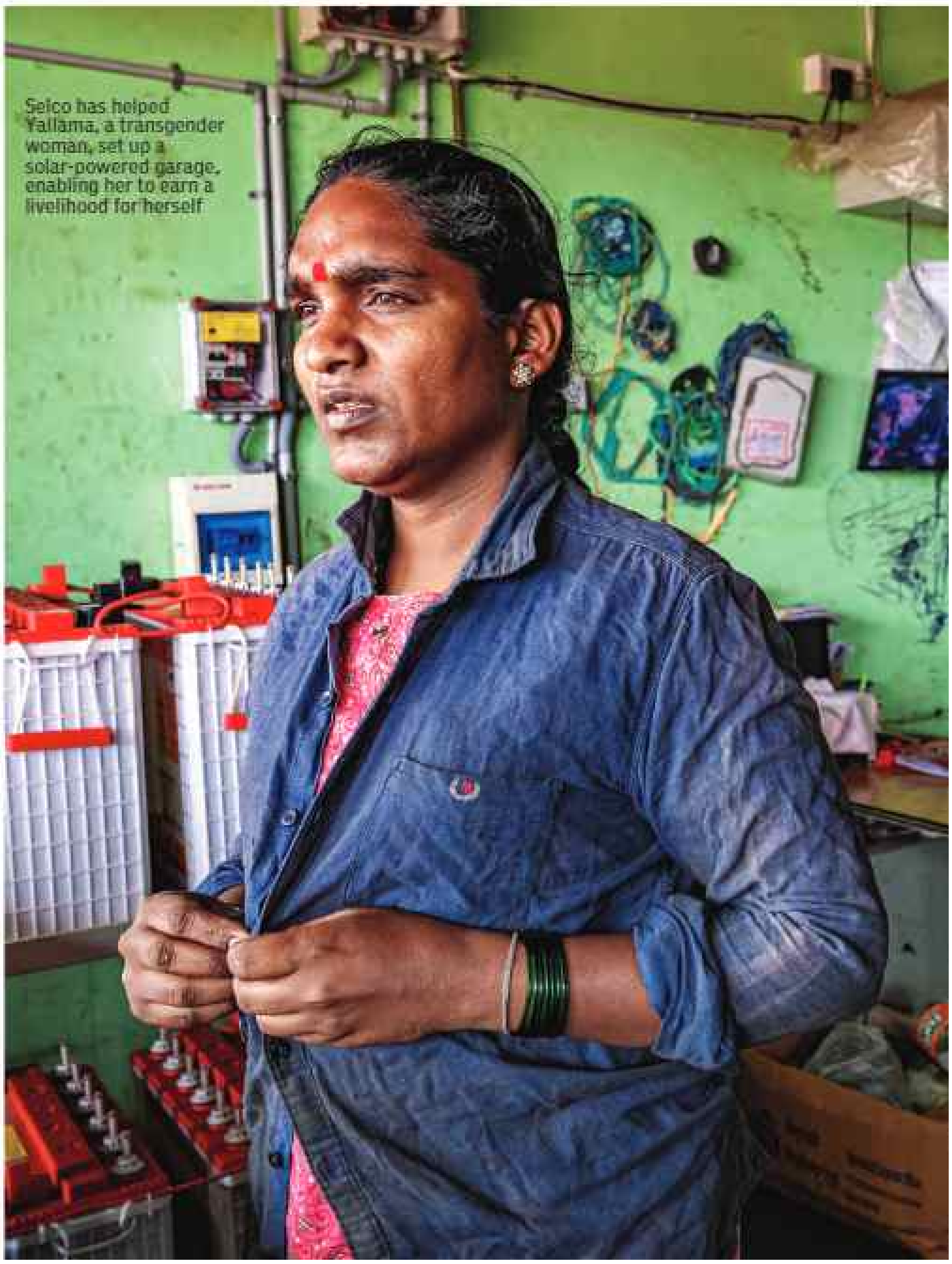
From garages to papad-making machines, solar-powered technologies are providing women with home-based micro-entrepreneurship opportunities, increasing their productivity and reducing drudgery

By NAINI THAKER

In Devanahalli, about 40 km from Bengaluru, in an auto repair shop by the highway, men in blue overcoats bustle around. As we approach closer to Om Shakti Garage, a woman dressed in a bright pink kurta, who has been working on her finances in a notebook, stands up from the desk in the corner and greets us with a warm smile: "*Namaste, mera naam Yallama hai. Main transgender hoon* [Namaste, my name is Yallama. I am a transgender woman]."

Born in Raichur in Karnataka, Yallama was thrown out of her house as a five-year-old, and ended up living on the streets, with begging her only source of income. "All I wanted was some respect," she tells us. She made her way to Bengaluru, where she decided to start learning at a mechanic's shop, pretending to be a man. Eventually, with the ₹10,000 she had saved up, she bought some tools and set up a small mechanic's shop by the road. Two years ago, she managed to rent a space in Devanahalli for Om Shakti Garage.

Around the same time, she came across the work that Selco Foundation has been doing. "I requested them to help me set up a garage," she adds. "We only get three hours of electricity in a day, and I need constant electricity



Selco has helped Yallama, a transgender woman, set up a solar-powered garage, enabling her to earn a livelihood for herself

PHOTOGRAPHS: SELVAPRAKASH LAKSHMANAN FOR FORBES INDIA for a functioning garage." Selco has helped her set up a fully solar-powered garage. "With the machines that Selco has helped me get, our work happens faster. Instead of working on one or two two-wheelers in a day, we now work on five to eight in a day," she says. She has also hired five workers in her team and is now earning ₹12,000 per month (after deducting ₹8,000 for rent) from her garage.

Yallama is only one of the many women with an entrepreneurial zeal that solar-powered technologies have helped to earn a livelihood for themselves.

India aims to achieve 500 GW of electricity generation capacity through non-fossil sources by 2030. In achieving this, solar power is playing a massive role—as per reports of the Central Electricity Authority, the renewable energy capacity has almost doubled in the last five years (at 131 GW as of July 2023), with solar capacities trebling. This push for solar-powered solutions is also encouraging women—who are both invisible and industrious—to become more economically empowered.

Currently, solar capacity stands at 71 GW, forming 54 percent of the total renewable energy capacity (up from 32 percent share in July 2018). In FY23, India added 15 GW of RE capacity. Of this, 12.7 GW was from solar. "While utility-scale solar will be important to achieve the scale, it will be essential to give a parallel emphasis to decentralised solar applications such as solar rooftop, solar-based livelihood applications, and solar pumps so that the transition is inclusive and people-centric," says Disha Agarwal, senior programme lead, Council on Energy, Environment and Water (CEEW). This is how women also play a key role in improving the usage of solar power in India. A recent report by Powering Livelihoods has shown that out of the 16,000+ early adopters of clean tech livelihood appliances in India, over 71 per cent are women.

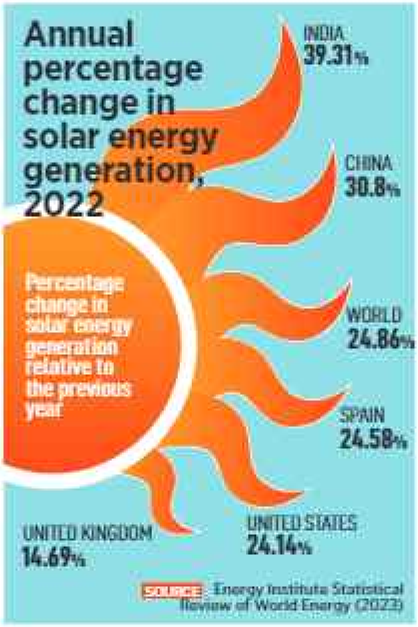
To make the most of her time, Yallama also bought Selco's solar-powered sewing machine, which sits at her home—20 minutes away from her workplace. She first started by fixing old clothes. "No one will trust me with new clothes, so I started asking people to give me their old clothes. Now I've learnt to stitch clothes from YouTube," she says. Every morning she wakes up at 4 am, goes to sell flowers, then works on her tailoring business and then goes to work at the garage. "Now I am a businesswoman. People in the community have started treating me with respect," she smiles.

Women in rural areas are key beneficiaries of decentralised renewable energy (DRE)-based technologies. "These technologies provide women with home-based micro-entrepreneurship opportunities, can increase women users' productivity and reduce drudgery. These also free women from several gender-assigned manual activities that are laborious," adds

Agarwal. One such example is that of Ramya Kumar, mother of two, who lives in a small village called Avathi in Devanahalli. Kumar was part of a self-help group run by Shri Kshethra Dharmasthala Rural Development Project. They introduced her to Selco's solar-powered milking machine, which she bought two years back through a loan. "Earlier, manually milking the cows would take 30 minutes, now it takes only five for each cow. It allows me to spend more time with my children and also do more work on the farm," she tells *Forbes India*. From selling the milk from the three cows her family owns, she earns around ₹25,000 to ₹30,000 per month.

"It is the woman of the house that is the agent of change. For our initial village meetings, it was always 90 percent women who attended these meetings, because they are the ones interested in changing their lives... women are an integral part of any transformational process," says Pratibha Pai, founder director, Chirag Rural Development Foundation. The NGO in 2018 developed an Integrated Village Development Model that engages in the multidimensional use of solar electrification on a holistic level, to catapult villagers out of poverty. In doing this, with solutions like solar water lifting, women's day-to-day chores have become a lot more efficient, allowing them some time to earn. "This is when women approach us, asking us for solutions where they can work from home, but also help their spouses on the farmland," adds Sabah Vig, CEO, Project Chirag. So, instead of going to factories, they go to the livelihood centres that are set up for them.

In working on some of these projects, adds Vig, "There are often allied costs that are so high that they are unable to sustain these. For instance, if a village has a solar pumping solution, she can easily set up a vegetable garden outside her home, and earn ₹250 to ₹500 per day selling vegetables. But if she had to pay for the diesel or the pipeline, just those initial costs would've demotivated her to set up this business." Now women are demanding solutions beyond the likes of solar-powered sewing machines, such as sanitary napkin production machine, agarbatti machine, among others.



The government has also realised the key role that women play in facilitating decentralised solutions, particularly in rural India. In November 2022, Finance Minister Nirmala Sitharaman at a National Solar Energy Federation of India's (NSEFI) 'Women in Energy' event said, "Women should be at the centre of India's energy transition and drive India's renewable energy journey growth story." Sitharaman also launched the Women in Solar Energy portal, for all women seeking job opportunities in the energy field.

On the policy front, the Ministry of New and Renewable Energy released a first-of-its-kind policy framework for scaling DRE livelihood applications in the country, in February 2022. "The objective is to facilitate adoption of DRE-based technologies, especially in regions with little or no access to power, targeting women and other marginalised sections," says Agarwal. The policy aims to promote DRE technologies among women by enabling access to finance, skill development and capacity-building through state rural livelihood missions, and technology promotion with the help of existing schemes and women self-help groups. "State initiatives on these lines will be essential to deliver on these objectives," adds Agarwal.

With the help of a solar-powered machine, Ramya Kumar can now milk each cow in five minutes, instead of the earlier 30, and spend more time with her children and farm work

INFOGRAPHICS: MUKESH SINGH

Two hours away from Bengaluru, in Honnapura, Bangalore North Taluk, 33-year-old Sowmya places freshly made papads in her solar-powered drying machine in her large verandah. She was making the most of the sunny day, and had spread papads all across the verandah. "Namaskara," she welcomed us.

Every corner is covered either with papads or chaklis or machines. Her husband passed away 10 years ago, after which she took over his work as a cable operator. But it wasn't sustainable, especially with two children. That's when she started making rice papads at home.

About three years ago, she started using Selco's solar-powered hydraulic papad press machine, which comes with a solar-powered dough kneader, and she has also invested in a chakli making machine. "Since I got so many machines, I have rented this space. Our home is 5 minutes away," she says. Since she started using the papad-making machines, her production has more than doubled.

"Instead of making one papad at a time, I place six dough balls on the machine and six papads are ready for drying," she says. In doing this, she has also saved immensely in terms of labour cost—from making the papads to buying raw materials once in three months and selling them, she does it all on her own. She supplies the papads to local shops as well as sells them once a week, at the local market for garment makers. She earns about ₹15,000 to ₹ 20,000 per month, and pays a monthly loan for the equipment that she's bought. "I want to make my own brand to sell these papads locally," she says.

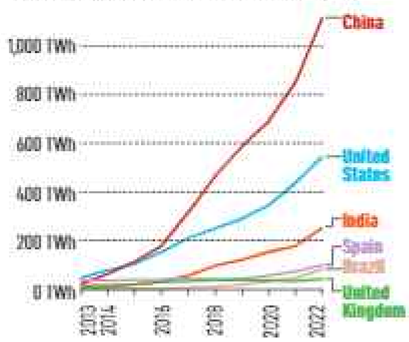
But there are multiple problems in implementing these solutions at the grassroots. Harish Hande, CEO, Selco Foundation says, "It is necessary to keep the livelihood of these women as the centrepiece and not solar energy. Once livelihood solutions are designed sustainably, solar power

Sowmya makes a living out of homemade papads with a solar-powered hydraulic machine

will automatically become viable and scalable." Solutions, hence, need to be designed keeping the demand-side and not focus on the supply side—this, Hande believes, will help solar energy scale up faster. For instance, for a solar-powered end-to-end dairy solution—water pump for cleaning the cow shed; solar-powered milking machine; cold storage to store the milk and then a solar-powered khoya-making machine. "If we only set up solar panels in a household, these interventions that economically empower women would not have been possible," explains Hande.

Primary energy consumption from solar

Energy consumption is based on primary energy equivalents, rather than final electricity use



Note: 'Primary energy' refers to energy in its raw form, before conversion into electricity, heat or transport fuels. It is here measured in terms of 'input equivalents' via the substitution method: the amount of primary energy that would be required from fossil fuels to generate the same amount of electricity from solar.

SOURCE: Energy Institute Statistical Review of World Energy (2023)

In doing this, organisations like Selco struggle to find the right partners. Hande adds, "Bankers also aren't always willing to give loans to 'women entrepreneurs', because more often than not she has no asset in her name and can't prove she can actually pay back."

They are also restrained by societal norms and bear the racism of education and intelligence. But Hande says, "They are very resourceful, and have the capacity fto run far better businesses as opposed to many of our B-school graduates." He recalls a conversation with a group of women who were hoping to expand their roti-making business to 10,000 rotis per day. "When I asked them what the potential was for these in their village, they said they have 10 bus drivers who take their rotis to the Majestic bus station in Bengaluru for a 10 percent commission."

While these are grassroot-level problems in terms of implementation of solutions, the bigger problem is the lack of CSR and philanthropic funding for innovation. Once an ecosystem is set up or innovative solutions have proven to work, the government can help scale it up. Says Hande, "Everyone wants to put in money for activism, and not in building an ecosystem and innovation.

A Study In Grey

While efforts to educate young minds on climate change gain momentum, experts argue that the current education system still falls short

By ANUBHUTI MATTA

In a survey conducted by University of Bath in September 2021, 60 percent respondents said they felt worried, sad, helpless, angry, powerless, and guilty about climate change. These respondents were not adults, environmental activists, or policymakers. They were children between the ages of 16 and 25 from 10 countries, including India.

In the next decade, India will have the highest population in this age group, according to UNFPA, "and they will have to face the brunt of climate change", says Mala Balaji, researcher-environment and climate action at Citizen Consumer and Civic Action Group (CAG), a Chennai-based non-profit working towards protecting citizens' rights in consumer and environmental issues.

"Middle school students are at an impressionable age where they are developing their critical thinking and decision-making abilities. Working towards introducing the right kind of environment education can help develop a sense of responsibility

CHAITANYA DINESH SURPUR

towards sustainability," she adds.

While recent initiatives at educational institutions and policy levels have started to integrate climate change education (CCE) into the curriculum, critics argue that the current education system falls short of adequately emphasising CCE.

Long way ahead

In June, the University Grants Commission (UGC) mandated all undergraduate programmes to include environmental education as part of their syllabus. This move is in accordance with the National Education Policy 2020 that recognises the importance of climate change education.

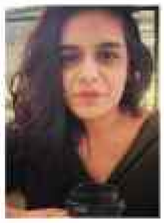
"But it won't help unless you catch them [students] young," says Urvi Desai, co-founder of EkoGalaxy, a platform for climate education and engagement.

In December 2003, the Supreme Court made it mandatory for schools to include environmental education in all grades of formal schooling.

Despite that, "even today, a majority of teachers or students are not in a position to explain what climate change is all about because environmental education is treated as a cursory subject", says Albert P'Rayan, an education columnist, teacher-educator, and English language teaching resource person.

Making matters worse, in June 2023, the National Council of Educational Research and Training (NCERT), a public body under the Ministry of Education (MoE) that develops Indian school curriculum, eliminated chapters on climate change and the monsoon to ease the load on students caused due to interruptions from Covid-19. Other topics such as Darwin's evolution, the periodic table, the Industrial Revolution were also omitted.

This impacts all Central Board of School Education (CBSE) schools in India or about 134 million children between the ages of 11 years and



"The climate crisis is moving very fast and our syllabus and research can hardly keep up with it."

Urvi Desai

co-founder, EkoGalaxy

18 years, says Desai of EkoGalaxy. "It is surprising, bewildering, that fundamental topics such as the Industrial Revolution, which created the world's first fossil fuel economy, that many argue contributed to the Anthropocene, were omitted," she adds. "It widens the gap rather than closing it."

Forbes India also reached out to Ministry of Education and University Grants Commission for comments but did not receive a response till the time of going to print.

Holistic & fun: Need of the hour

"Climate education needs an integrated approach and without the guidance on how to do this, neither the students nor the institutions can give the seriousness it deserves," says Harini Nagendra, director, Research Centre, and Centre for Climate Change and Sustainability at Azim Premji University.

Some subjects like literature do a good job of incorporating climate change and connecting it with languages, but other subjects lack this approach. For instance, learning about crops in Geography should be related to climate change, Nagendra says.

"Unfortunately, it's not taught like that. The curriculum is not interconnected and that needs to be worked upon given how climate change affects every aspect of our society, from education to gender dynamics, and even the economy," she adds.

P'Rayan also attributes the lacklustre implementation of CCE to inadequate training among teachers. For Desai too, the problem is that the subject is not taught in an engaging or action-oriented manner. "The climate crisis is moving very fast, and our syllabus and research can hardly keep up with it," she says. To address problems like these, startups like hers are narrowing the gap between theory and practical education, as well as training teachers.

Co-founded with Shreyas Sridharan, an entrepreneur in the field of solar thermal technology, EkoGalaxy wants to make climate education accessible and engaging to all students. For instance, their theory is supplemented with experiential games, outdoor activities, music, drama, debate, and more. EkoGalaxy, an early-stage startup, currently has operations in Telangana, Andhra Pradesh, Tamil Nadu, and Karnataka, along with European school collaborations.

"Students are concerned about the climate crisis, but it isn't being fully addressed by the existing school curriculum. When it is addressed, it is very anxiety-inducing as opposed to sparking critical thinking and offering actionable steps," says Desai. "Hence, we work with schools and colleges to develop curricula that sparks that curiosity and keeps it alive," she adds.

Going further, Balaji of CAG feels there is no learning continuum or progression of content related to climate change across school education.

To help solve this issue, in February 2023, CAG curated a curriculum on climate change education that included thought-provoking lessons, activities, and illustrations. The pilot was implemented in two Chennai-based schools with a total of 47 students from grades six up to eight, both from affluent backgrounds and those that were first-generation learners.

The results showed that 75 percent of students gained a basic understanding of the causes and impacts of climate change, as opposed to 55 percent before the curriculum was introduced. The teachers' understanding of the subject went up from 60 percent to 85 percent, notes Balaji.

She informs that they are now in the process of translating the English language book into Tamil and introducing it in five government schools in five districts in Tamil Nadu. Their plan is also to urge the government to include climate change as a standalone subject in the school curriculum.

In addition to these steps, experts such as Nagendra and Desai feel that it is also important to localise the curricula.

"We don't have enough that is produced in our context. For instance, children in Ladakh versus those in Karnataka should be learning about how climate change affects their region and what kind of action they must take keeping that in mind," says Nagendra. "We hope that publishers take notice of this and start bringing books in different languages," she adds.

Desai feels that we can look at our rich, indigenous culture and communities who have protected the environment, and if we learn from them, we could go a long way, she says.

A new wave

While institutions such as the Indian Institute of Technology (IIT) and Indian Institute of Science (IISc) have had modules on climate education for many years, others universities have developed innovative programmes in recent times.

Azim Premji University introduced a BSc major in environmental science and sustainability. Launched in August 2023, this programme encompasses scientific, social, and humanistic perspectives on climate change, along

"Climate education needs an integrated approach and without guidance, neither the students nor the institutions can give it the seriousness it deserves."

Harini Nagendra
director, Research Centre and Centre for Climate Change and Sustainability, Azim Premji University

with practical skills to enact change.

"We need more programmes that bridge the gap between science and social sciences, creating climate-aware graduates who can drive change across various sectors," says Nagendra, the director of the centre.

Anant National University launched the Anant School for Climate Action in July 2022. The school currently offers two foundational courses—a four-year bachelor of technology programme specialising in climate change, and a one-year fellowship for climate action.

Students will learn to build technology solutions for mitigating or adapting to climate change, use specialised software for simulating climate impact, and be part of live industry climate projects. They will have the chance to specialise in using climate technologies for business or policy, as well as a deeper specialisation in climate technology itself.

"We decided to start an engineering degree programme so that the students come out with very tangible skills for solutions rather than focusing on just the problems," says Miniya Chatterji, founding director of Anant School for Climate Action.

The candidates with this degree can get jobs in public and private sectors, as well as academia. "There is a surge of demand for climate engineers, yet the supply of talent is very little," says Chatterji.

Ashoka University's Ashoka Centre for People-Centric Energy (ACPET) was launched in March 2023 and is currently prioritising projects such as renewable energy, energy efficiency and conservation, and more.

"All the research that we do in the centre is oriented towards bringing about change and causing an impact in the desired direction," says Leena Srivastava, director and head, of ACPET.

She adds that while we have seen a rapid increase in the number of courses offered on climate change and sustainability across well-renowned institutions, it is a subject that needs to be incorporated in every university of the country. "But we still have a very, very long way to go," she adds.

Two Steps Forward, One Step Back

In **December 2003**, the **Supreme Court** made it mandatory for schools to include **environmental education** in **all grades** of **formal schooling**

In **June 2023**, the **NCERT**, which develops the **Indian school curriculum**, eliminated chapters on **climate change**, **monsoon**, and more

This impacts all **CBSE schools** in India or about **134 million children** between the ages of **11** and **18 years**

In **June 2023**, the **UGC** mandated all **undergraduate programmes** to include **environmental education** as part of their **syllabus**, in accordance with the **National Education Policy 2020**

Revolutionising the field of healthcare

A transformative journey of excellence and passion

Dr. Yashraj P. Patil is the Trustee and Treasurer of Dr. D.Y. Patil Vidyapeeth (Deemed to be University), Pimpri, Pune and the man behind the unprecedented rise of one of the top private hospitals in India today – DPU Private Super Speciality Hospital, Pimpri, Pune. Dr. Yashraj has been vastly instrumental in strengthening a strong sense of trust associated with the Dr. D.Y. Patil brand name in Pune today. With his unwavering dedication and visionary leadership, he is the driving force behind the success of both these institutions, which are considered one of the pioneers in the field of healthcare.

Dr. Yashraj has played a pivotal role in reinforcing DPU Private Super Speciality Hospital, Pimpri, Pune as a truly patient-centric hospital in India. As the people's leader, he has a steadfast focus to ensure that the hospital provides the highest quality of healthcare and remains at the forefront of medical innovation.

Strongly driven by a vision of building a strong healthcare ecosystem, including a world-class Superspecialty hospital with a "patient-first" philosophy at its core, Dr. Yashraj has a lion's share in making the hospital a force to reckon with today. Under his astute leadership, DPU Private Super Speciality Hospital, Pimpri, Pune has scaled new heights in healthcare excellence. Today, it stands as one of the largest private super-specialty hospitals in India, equipped with state-of-the-art infrastructure, ultra-modern facilities and luxury private rooms. It is one of the few hospitals in India with more than 2000 beds catering to different specialties and super specialties. It houses advanced diagnostic equipment and state-of-the-art digital X-ray machines, ensuring accurate and timely diagnosis. Additionally, the hospital has 18 modular operation theaters, more than 175 ICU beds, and a Hi-Tech Robotic Surgery Centre, which reflects Dr. Yashraj's commitment to making cutting-edge technologies more accessible and affordable to patients.

> "Today, we are trusted by millions of patients as a trusted hospital where patients are not just treated, but cared for with respect, empathy and compassion. Through a strong focus on innovation and technological agility, we have established an unparalleled legacy in the field of healthcare and patient care. We continue to have a focus on a truly world-class Superspeciality hospital that sets a new standard in the world of healthcare" – Dr. Yashraj Patil, Trustee and Treasurer, Dr. D.Y. Patil Vidyapeeth (Deemed to be University), Pimpri, Pune

Dr. Yashraj P. Patil
Trustee & Treasurer,
Dr. D. Y. Patil Vidyapeeth
(Deemed to be University), Pimpri, Pune

Amongst the many milestones achieved by DPU Private Super Speciality Hospital, Pimpri, Pune under Dr. Yashraj's leadership is the Centre of Excellence for Multi-Organ Transplant. The Centre recently completed 300 successful multi-organ transplants, including Pune's first fully robotic live liver transplant surgery. It is one of few hospitals in India to have a high success rate of the complex Pancreas transplants as well as dual Heart and Lung transplants.

Under Dr. Yashraj's leadership, DPU Super Speciality Hospital has achieved remarkable industry-first breakthroughs such as getting Asia's first 3 Tesla-Vida MRI scanner, Pune's first Time-lapse imaging Embryoscope, Pune's first 4th Gen Da Vinci Xi robot with Dual Operating Consoles, and the pioneering Anti-ageing Fotona Laser Machine, all of which have significantly enhanced the hospital's clinical capabilities and have empowered them to set new standards in innovation, productivity, and patient comfort.

Being one of the first hospitals in India to house these revolutionary innovations in the field of healthcare position the hospital as a leader in medical advancement. Dr. Yashraj's contributions extend to initiatives like the establishment of the Private OPD and Wellness Program, and the IVF & Endoscopy Center, solidifying the hospital's status as India's trusted healthcare destination.

Dr. Yashraj envisions positioning India as a global healthcare destination through strategic collaborations, strengthening the footprint of medical tourists to benefit from the exceptional care of the hospital. The establishment of an International Patient Desk exemplifies this ambition, catering to personalized needs of international patients.

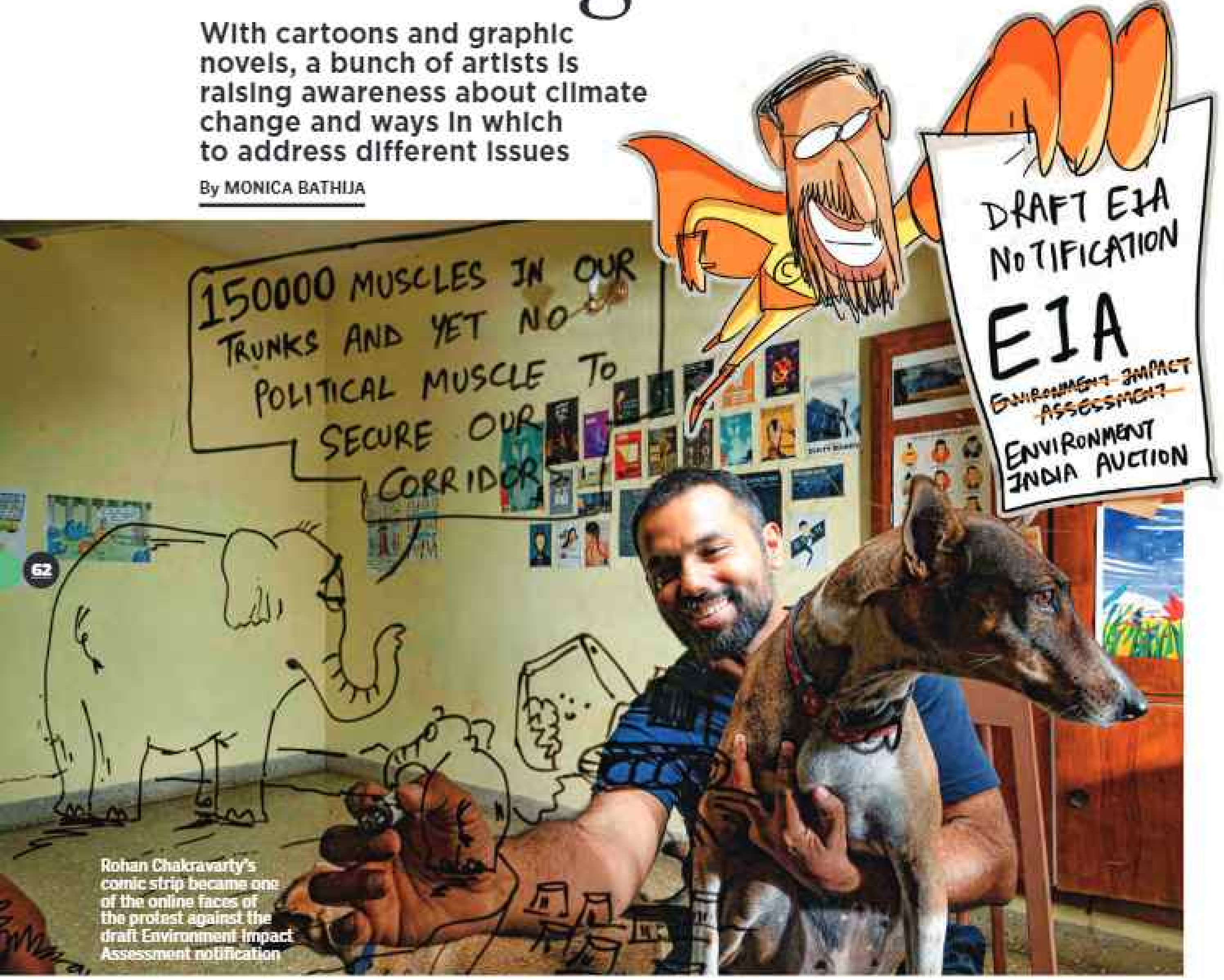
Dr. Yashraj P. Patil's exceptional contributions to healthcare are evident through prestigious awards and accolades such as the Times 40 Under 40 awards, conferred upon him for his remarkable contributions in the healthcare industry. Under his able leadership, the hospital received two prestigious awards, 'Best in Healthcare Infrastructure' and 'Excellence in Healthcare' at the Times Power Brands 2023 held in Pune recently. These accolades not only honor his individual achievements but also highlight the positive impact he is making on the healthcare industry as a whole.

Continuing his journey of excellence, he remains dedicated to transforming healthcare, inspiring generations to aspire for leadership and change. His visionary leadership and unwavering commitment have turned DPU Private Super Speciality Hospital, Pimpri, Pune into a beacon of hope, showcasing the power of passion and innovation. Dr. Yashraj's resolute dedication, visionary leadership, and unwavering commitment to excellence have positioned him as a pioneering figure in healthcare, leaving an enduring mark on the industry.

Drawing Attention

With cartoons and graphic novels, a bunch of artists is raising awareness about climate change and ways in which to address different issues

By MONICA BATHIJA



Rohan Chakravarty's comic strip became one of the online faces of the protest against the draft Environment Impact Assessment notification

VIKAS CHANDRA PURETI FOR FORBES INDIA

Around three years ago, when an environmental notification widely thought to be diluting India's green laws was being tossed about, cartoonist Rohan Chakravarty brought out his character Clearance Man. With a few strokes of his 'brush', he depicted Clearance Man going about destroying all obstacles for corporates and industries, and providing clearance to projects.

Though lawyers and climate experts had been tweeting about the draft Environment Impact Assessment (EIA) Notification 2020 to create awareness, engagement was low. "Because the news around the draft EIA was not simple enough, nobody really bothered reading more about it or understanding what it means for citizens," says Chakravarty, who has for the last 13 years been publishing Green Humour, a series of cartoons, comics and illustrations on wildlife, nature conservation and sustainability. Chakravarty teamed up with two environmental lawyers who explained "the most salient features of the notification

"If there are enough individuals who are willing and wanting to change the way they live, the markets will follow suit."

Alina Sen, senior communications specialist and archivist

COMIC COURTESY: CEEW

and then I depicted that as a comic strip". The comic strip brought in engagement and eventually became one of the online faces of the protest against the draft EIA.

Climate change is at the centre of global dialogue on issues ranging from emissions to energy sources, and from sustainable fashion to wildlife biodiversity, the words meaning many things to many people. And though there is a vast amount of data and research, discussions around them remain abstract, full of jargon and far removed from everyday lived realities. Step in individuals and organisations who are using visual communication in the form of cartoons and comic strips to simplify and get the message and urgency of climate change across in a succinct, engaging and impactful way.

"Comics are a very fertile medium as they let you humanise some of the issues so that they become more accessible for citizens to engage with," says architect-urban planner and independent comics artist Nikhil Chaudhary who makes connections between urban issues, planning and climate change. His 2012 comic, Pedestranged, depicts the apathy of civic bodies towards the plight of pedestrians, the hurdles a majority of the population faces as they try to walk in the city, and the problems that arise out of planning cities for cars.

"There's a clear link between enhanced or improved walkability and reduced traffic emissions, which of course ultimately contributes to climate change mitigation," says Chaudhary. Another comic, on salt pans, titled Saline Intrusions, was published in a Harper Collins anthology of graphic narratives a few years ago. Through the comic, Chaudhary focussed on the story of a migrant worker he interviewed in Wadala in Mumbai: "We get to understand all the urban policies and construction regulations that have been watered down to build more and how it's actually leading to more risk of flooding for the city."

Cartoonist and graphic storyteller Poorva Goel too sees storytelling as her role in the larger movement. "Comics are a more engaging way of reporting the stories I want to," says the 26-year-old who has worked on graphic publications and collaborates with experts, researchers, and social and environmental movements and organisations. Her stories, whether it be highlighting the threats to the biodiversity of the Western Ghats or the Idu Mishmi people affected by a dam project in Dibang Valley in Arunachal Pradesh, are a way to "make visible the inequity behind

Nikhil Chaudhary's comic, Pedestranged, depicts the apathy of civic bodies towards the plight of pedestrians

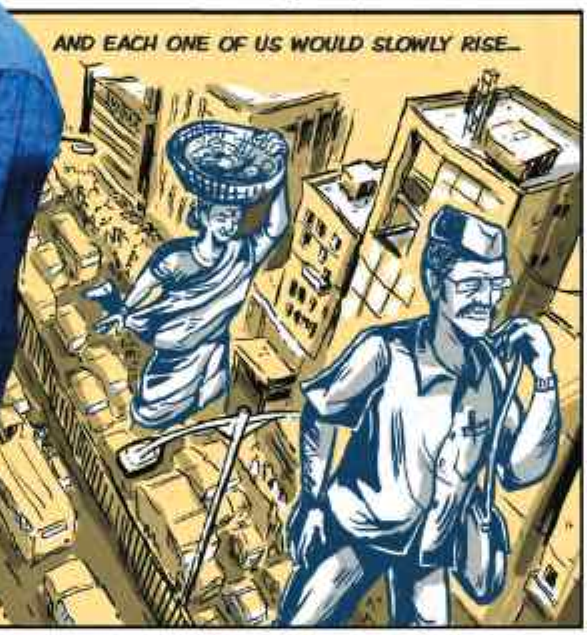


PHOTO COURTESY: NIKHIL CHAUDHARY; NEHA MUNDEKAR; COMIC COURTESY: NIKHIL CHAUDHARY development". Originally from Dehradun, where she has seen forests and rivers disappearing "in my own short lifetime", she is currently doing her Masters in Graphic Storytelling in Belgium, and also attended the United Nations Convention on Biodiversity (COP15) in Canada on a fellowship last year. "At the COP15, they used very obscure, complex language around climate policy, which is very inaccessible to the lay person. So I see my role as a communicator to simplify that and present it in a more palatable, digestible form."

Cartoonist Chakravarty too was part of the last two climate change COPs, COP26 and COP27, both of which he drew live and which, he says, "exposed me to an entirely new side of climate change that I hadn't explored in my own work before".

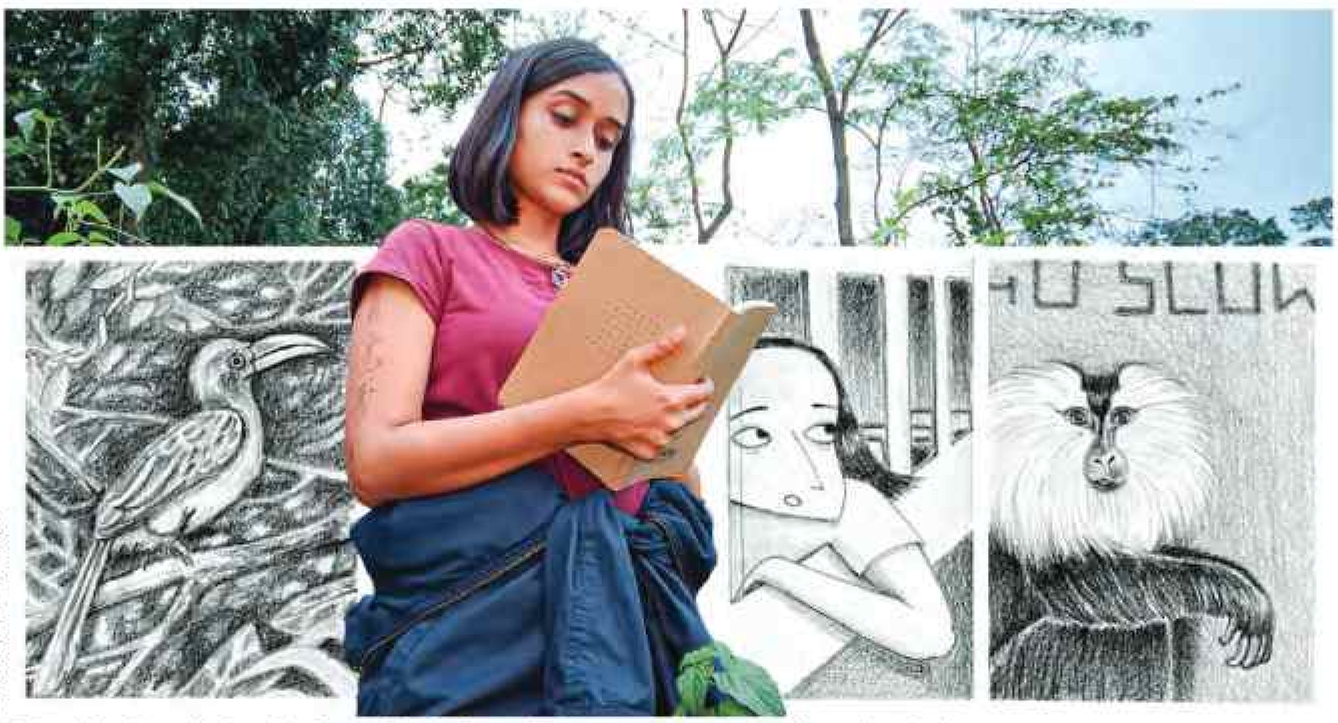
"Under graphic design there are a lot of things you can do, from brand design to publication design, but what I love about comic strips is how it just makes such a large subject so brief, like one or two lines and images and you still get the whole story," adds designer Ashvini Menon. For Menon, her design skills were just a way of earning a living until a design thinking course at the National Institute of Design made her realise that her work could create social impact. Though she went on to work at Microsoft, she wanted to see how design could impact sustainability and wildlife conservation.

While at Microsoft she did a part-time course on sustainable development in India at IGNOU, quit and moved to Mumbai, reached out to NGOs who she later collaborated with on design projects and also landed a comic strip Ecotism in *The Hindu*. Though she has moved back to a full-time job at Salesforce, she continues to do a bi-monthly cartoon strip Overherd in *Protected Area Update*, a newsletter by environment action group Kalpavriksha in Pune.

Challenges and jargon

One of the challenges of communicating about climate change is that it happens gradually, over a long period of time, and so it's difficult to make the connections. Comics, says Chaudhary, who works as a Cities Advisor with Climate-KIC, a European Union-affiliated non-profit organisation, are a good medium to tackle this because they allow you to go back and forth. "I can deal with almost two or three parallel stories side by side, juxtaposing the before and after visuals, what was before, what is in the present and also what it could be in the future in terms of a very compressed visual timeline," says Chaudhary, who employed the technique in Saline Intrusions.

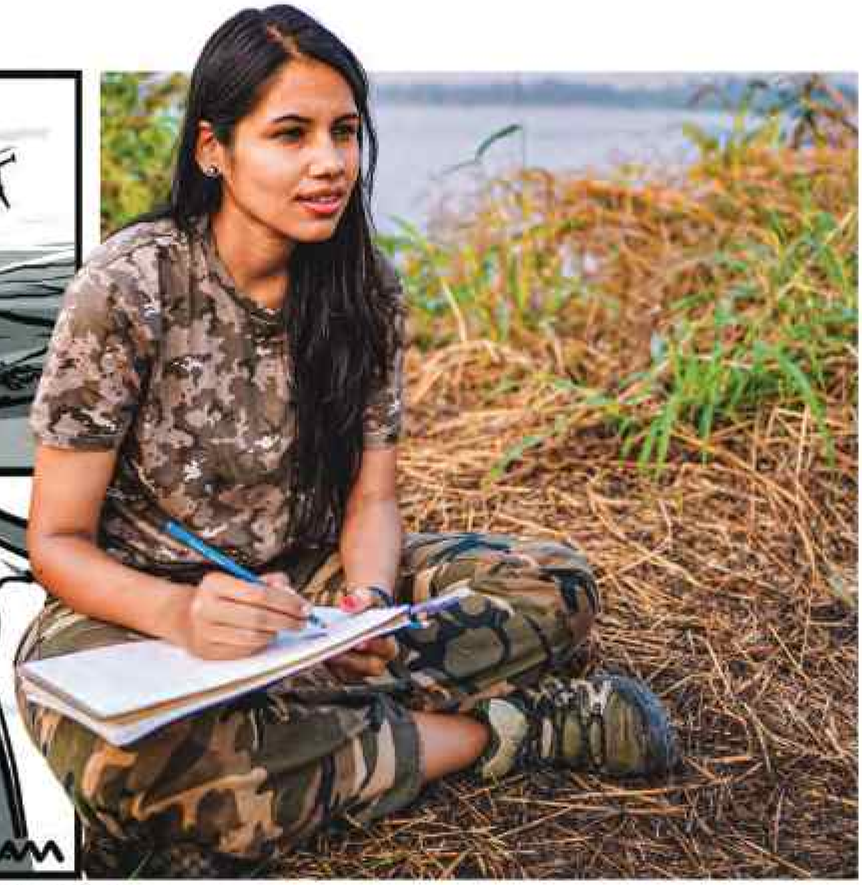
Richie Lionell, founder of data storytelling firm Bezalel Data, also recently compressed a vast time frame into a short, animated emoji on abnormal temperatures, turning abstract data into something easily digestible and immediately relatable. In the short 'story' a smile turns into a frown as the temperature, mapped from a cooler blue in 1850 gradually rises turning red by 2020. "If you're just going to stick to



COMIC COURTESY: POORVA GOEL

Cartoonist and graphic storyteller Poorva Goel feels comics are a more engaging way of reporting stories

COMIC COURTESY: ASHWINI MENON



Designer Ashvini Menon landed a comic strip, Ecotism, in *The Hindu*

traditional report structures, it's not going to reach the masses. Data comics simplifies the language... the moment you bring comics, it forces you to shift from a written tone to a more conversational tone," says Lionell, who holds data storytelling workshops and has worked with IndiaSpend and Azim Premji University, where he got interested in climate data.

In an era of too much information, cutting through the clutter and the bombardment of messages is another challenge. As is the fact that climate change feels far removed from lived reality. "When you're bombarded with multiple channels of information, you sort of develop a thick skin as it were, where you may or may not react to it, and we are all at this point in time in that situation," says Alina Sen, senior communications specialist and archivist at thinktank Council on Energy, Environment and Water (CEEW), which under strategic outreach employs various modes to communicate on sustainability and climate change, from comics (a cartoon series What On Earth!) and short films to music and poetry (see box). The communication uses humour, is informative, not preachy, and provides action points to individuals, ways they can make a change. Images of gloom and doom, she says, may make you sit up, "but if you're not going to show me a pathway to repair, where I can reclaim agency and do something about it, it's not a great place for people to be in".

There should be action points that go beyond the common perception of planting a tree and bring in other images of what sustainability means, like perhaps riding an EV or making the Metro the transport of choice, she says. If climate change feels far removed from people's reality, providing local hooks and connecting the dots helps, for instance between landslides and cyclones, and flooding events and getting stuck in the Metro. "If I sort of expand the syntax and the set of occurrences and events and connect one of them to you and say 'were you here, did this not happen, so that could just be climate change', then people will sit up and take notice," says Sen.

Driving impact and change

Even as his cartoons have been used by various organisations to create awareness, when Chakravarty brought home the message of the draft EIA through his comic strip, there were, he says, "as we all know 600,000 signatures and put the government on the back foot, at least then. Of course, with the Forest (Conservation) Amendment Bill 2023 now a lot of that has been reversed". But it drove home the point, he adds, that comics and art have the power to communicate a crisis better, and draw in more people from various backgrounds rather than just people who have something to do with science.

Goel agrees. She recollects a comic book she did for an NGO based on a report they had come out with. "And they said their accountant had never read any of their reports. But now that it was available in the form of comics, she read it for the first time. That made me think about how comics can make things more accessible and more interesting or fun to read," she says.

Not all impacts may be immediately tangible but almost all strike a chord or help start a conversation. Menon recollects how a comic about the burying of a lake for construction brought in reactions from students and people who had personally experienced it. And when Chaudhary put up a video of his pedestrian comic titled I Pedestrian, "it went, as they say, viral", he says. He got messages from all over the world, including one from someone in South Korea who wrote in saying how they had showed the story to someone who had been in a life-threatening accident, "just to show that it's not just your individual fault that you were in harm's way, but a range of issues that contributed to you being in that position", a touching reminder of seeing the reach of his work in ways he didn't really expect.

And if there is enough awareness and individual action, it ultimately adds up. "If there are enough individuals who are willing and wanting to change the way they live, the markets will follow suit because they will now cater to a growing demand," says Sen of CEEW, adding that then policy has no role. "It will have to change because you have your two big pillars, your people and your markets, responding to this new way of life, which is less of use and throw, but more of reuse, recycle, the circular economy. That's the opportunity. We have to look at action and not apathy. I think that's the responsibility that all of us have as communicators."

Love, e-bikes and solar panels

Writer and poet Amandeep Singh

Subtle, nuanced storytelling about climate change also found expression through poetry and the spoken word at CEEW recently when it tied up with a few performance poets to come up with a series titled 'Love in the Time of Climate Change', which explores the universal theme of love while acknowledging climate change as an accepted reality.

CEEW had earlier worked with performance poet Simar Singh, whose interpretation of a 150-page report (Stockholm+50: Unlocking a Better Future) in the form of a poem 'Portrait of a Silver Lining', made a call for bold climate action and accountability to heal the planet.

When CEEW again reached out to Singh, also the founder of UnErase Poetry, a platform for promoting spoken word artistes in India, with the idea for a series, he was, says Sen, excited and keen to do more poems along with his cohort. A workshop with a few shortlisted poets followed, where they discussed climate change and its nuances, including small and large impacts that we see today. The mandate was to write a love poem based on their personal experiences, but which would have glimpses of climate change impacting or shaping their story.

"If I knew like 30 to 40 percent, they filled me up till 60 or 70 percent with the latest updates and the research they had. And then we tried working on a piece and they helped us work on the facts," says one of the poets and writer Amandeep Singh whose poems always had an element of the way nature and industry coexisted in Jamshedpur, where he grew up, but weren't climate centric per se, adding that the climate change factor even now had to be subtle and not preachy. "We came to this resolution that we'll not go out and tell people, 'OK, don't do this, don't do that'. We'll tell them a beautiful story, where we'll leave anecdotes, we'll leave ideas and we'll leave awareness around climate change," says the writer of the poem '*Wo Laut Aai*', which subtly but surely interweaves electric vehicles and solar panels into a love story.

The poems, seven in all, including Simar Singh's 'I love her like a solar panel loves the sun' were launched on World Poetry Day in March and by mid-August had got 54 lakh views across the seven poets, across the poems, reels and "the multiple ways in which we amplify it", says Sen.

SANKHADEEP BANERJEE FOR FORBES INDIA

BUILDING THE FUTURE: IS THIS INDIA'S MANUFACTURING BREAKOUT MOMENT?

The recent PwC India and CNBC-TV18 CEO Dialogues highlighted India's growing manufacturing prowess, seen through better exports and innovative approaches. A significant step towards India's global manufacturing recognition.

Prominent manufacturing leaders convened for the third episode of CEO Dialogues, a collaborative effort by PwC India and CNBC-TV18. Amidst the topic of reshaping global supply chains, the spotlight turned to a pivotal question: Could this be India's manufacturing breakthrough moment?

With a promise of uncovering India's manufacturing strengths, the leaders discussed the call for enhanced manufacturing and a focus on exporting quality goods at reasonable costs. Sectors like electronics and machinery witnessed remarkable growth, with electronics exports surging by 73% between 2015 and 2022, and machinery exports expanding by 40%. India's presence in the automobile sector grew from 1.11% to 1.32%, marking progress in the global market.

The leaders also highlighted the importance of technological innovation, a key determinant of how well Indian products are received worldwide. Emphasising sustainable innovation, they underscored the need for modernising operations and supply chains, envisioning products that meet global standards while remaining eco-friendly and robust.

Guided by Sanjeev Krishnan, Chairperson, PwC in India, and led by Shereen Bhan, Managing Editor, CNBC-TV18, the gathering also featured Bharat Kaushal, MD, Hitachi India Pvt. Ltd., Shashank Shrivastava, ED, Maruti Suzuki India Ltd., B Thiagarajan, MD, Blue Star Ltd., Preeti Bajaj, CEO and MD, Luminous Power Technologies Pvt. Ltd., Atul Lall, Vice Chairman and MD, Dixon Technologies (India) Pvt. Ltd., Sunjay Kapur, Chairman, Sona Comstar, Arun Shukla, CEO,

JK Lakshmi Cement Ltd. and Sudipta Ghosh, Industrial Products Leader and Partner, PwC India.

Navigating challenges and expanding horizons

Sanjeev Krishan, Chairperson, PwC in India, discussed the significance of sustained technological investments for India's innovative potential, emphasising the need to nurture research and development (R&D), and innovation as the nation's hallmark.

'Just as we talk about any service industries or even health, I think the investment in R&D and innovation is crucial. Currently, India is the innovation hub,' Krishan emphasised.

Furthermore, B Thiagarajan and Sunjay Kapur shed light on India's manufacturing landscape, highlighting the prevailing spirit of transformation and the imperative of global competitiveness in the auto components industry.

'The production linked incentive (PLI) scheme has helped the air conditioner industry in India. Companies will dilute the PLI scheme into reducing pricing,' Thiagarajan said.

Revolutionising mobility solutions for India's automotive future

Shashank Shrivastava emphasised that the business model is shifting from merely manufacturing of vehicles to a more holistic perspective of providing mobility solutions. Their concept, known as 'vehicles-as-a-service', intends to leverage technology's rapid evolution and the country's inherent strengths in various fields.

Confronting disruptions and embracing digital transformation

The CEOs addressed the prevalence of disruptions in demand, supply, logistics, and manufacturing by discussing strategies to adapt and build resilience. They also discussed the impact of digital interventions on middle management and strategies for fostering lasting organisational change.

Preeti Bajaj is optimistic about the Indian manufacturing landscape and she highlighted digital skilling, sustainability, and employee safety for the growth of this sector. She also underlined the importance of the hunger for leadership and learning for a skilled workforce.

On the current state of the manufacturing industry, Preeti Bajaj added, 'I see the Indian manufacturing ecosystem very positively. We are witnessing remarkable growth and innovation, fuelled by the indomitable spirit of the Indian workforce.'

As the event concluded, one thing was clear: India's manufacturing sector is heading towards a remarkable future. With innovation, digitisation and sustainability leading the way, the sector is poised to become a global force, leaving a legacy for generations to come. As the discussion concluded, the concluding question of whether this is India's moment to shine on the global manufacturing stage was answered with a resounding 'yes.'

Amit Prothi

The writer is director general, Coalition for Disaster Resilient Infrastructure, launched by the Indian government in 2019

Building Resilience Amid Climate Extremities

Climate extremities create an extra burden on developing economies, where they grapple with building new infrastructure while operating the existing ones

Climate extremities have gripped the world and its impacts on people and infrastructure are increasingly evident. Europe is grappling with record-breaking heatwaves with temperatures in Italy soaring to 45ºC. Guatemala had declared a state of emergency in the wake of the damages caused by Hurricane Julia last October. The Central American country continues to face heavy rainfall and strong winds since May this year. In Asia, northern parts of India witnessed record rainfall in July this monsoon, resulting in flooding in various parts of Delhi, as river Yamuna spilled over, displacing people and disrupting livelihoods.

The latest IPCC (AR6—WGII Impacts, Adaptation and Vulnerability) states that 40 percent of the world's population is vulnerable to impacts caused by climate change, while 1 billion people are at risk from coastal hazards. Target D of the Sendai Framework for Disaster Risk Reduction 2015-2030 also emphasises resilience of critical infrastructure and significant reduction in disaster-related damage. Hence, a focus on Disaster Resilient Infrastructure (DRI) is a promising pathway towards sustainable development. The Coalition for Disaster Resilient Infrastructure (CDRI) speaks about 'The Resilience Dividend' in its report on Global Infrastructure Resilience to be launched in October.

AMIT DAVE / REUTERS

People walk on a makeshift bridge above a waterlogged street in Ahmedabad

The Significance of DRI

DRI is defined as infrastructure systems and networks, the components, and assets thereof, and the services they provide, that can resist and absorb disaster impacts, maintain adequate levels of service continuity during crises, and swiftly recover in such a manner that future risks are reduced or prevented.

Critical public infrastructure systems such as power, telecommunications, transport, water, education, and health form the foundation over which countries grow their economies. In the developing world, well-functioning critical infrastructure systems are vital for the well-being of citizens, their livelihoods, and crucial in pursuance of their economic goals. Climate extremities create an extra burden on them where they grapple with building new infrastructure while effectively operating the existing infrastructure. As the world urbanises with a greater share of GDP coming from urban economy, vitality of such critical infrastructure becomes even more pertinent.

The failure of one interconnected infrastructure system during a natural hazard can cause a cascading effect on others, paralysing service delivery networks. For example, a power grid failure can disrupt data centres, affecting communications and leaving people and businesses in disarray. That's where the role of DRI becomes crucial in enhancing overall disaster resilience.

The increasing frequency and intensity of natural hazards as ushered in by climate change is stressing existing infrastructure beyond its design limits with an emerging risk of collapse. The surge in operating costs after a natural hazard can create substantial spillover effects on society and the economy. For instance, it is estimated that, by 2030, in absence of significant investments in making cities more resilient worldwide, natural hazards may cost cities $314 billion annually. Hence, a shift towards DRI and adaptive urban planning is critical for enhancing human well-being.

The Indian advantage

The Global Climate Risk Index 2021 had ranked India 7th in the list of most affected countries in terms of exposure and vulnerability to climate risk events. By 2035, around 675 million people in India are expected to become urban residents. The government has taken cognizance of the fact and recognised this opportunity by unveiling a Gati Shakti Plan that comprises multi-sectoral infrastructure schemes across ministries and state governments. It earmarked $1.3 trillion for the development of integrated infrastructure in the coming 25 years. As most of the infrastructure required to achieve SDGs and to sustain the increasing urban population is yet to be built, herein lies an opportunity to integrate DRI perspectives in the planning of infrastructure projects.

In the context of Indian urban areas, a degree of progress has already been made in constructing resilient buildings, through stricter construction codes. In addition, smart city projects have been integrating elements of climate resilient infrastructure, emphasising the need for more sustainable and resilient urban development.

The Global Climate Risk Index 2021 had ranked India 7th in the list of most affected countries in terms of exposure and vulnerability to climate risk events

For instance, in Rajkot, Gujarat, a focussed strategy to tackle water stress and seasonal flooding includes investments in groundwater recharge structures and a watershed-level study to identify micro watersheds. Key improvements in the storm drainage system and specific locations for effective groundwater recharge were pinpointed.

In 2018, when Kerala floods destroyed over 10,000 km of roads and affected 25 percent of the state's major routes, cutting off connectivity for several communities, the state government launched the Rebuild Kerala Development Programme (RKDP). It is rebuilding 7,000 km of roads in a climate-resilient manner, using a GIS-based road maintenance management system including a seven-year maintenance contract model.

Opportunity for mainstreaming disaster risk assessments

Understanding of risks, such as changing cyclonic patterns from global warming, can help inform adjusted standards for future construction. Building codes and design standards offer a pathway to integrate resilience into multi-sectoral infrastructure planning, design, and implementation, as seen in earthquake-resistant buildings. An opportunity lies in enhancing the capacities of those responsible for planning and building infrastructure. This encompasses choices from appropriate siting and innovative design of infrastructure to regular day-to-day maintenance. For example, designing infrastructure responding to risks posed by flood-prone areas or ensuring drain cleaning before monsoon season, both can impact an infrastructure system's resilience to disasters.

Infrastructure risk assessments are the crucial first step in identifying the vulnerabilities of existing infrastructure. Airports and other transport sub-sectors, power, and the telecommunications sector must conduct disaster risk assessments at regular intervals and develop appropriate risk mitigation measures. Cities and towns should also mandate localised assessments to provide data for comprehensive, customised local planning. Incorporating climate and disaster-resilient infrastructure through risk-informed urban and rural planning requires a multi-faceted approach involving data, driving investments, policy interventions and capacity building of various stakeholders.

Resilient way forward

The resilient way forward in India will require facilitating an enhanced understanding of disaster risks from all major hazards in multiple geographical contexts through GIS-based mapping and information platforms, data-informed infrastructure planning and asset management, boosting risk-informed investments, early warning systems and other innovative technologies. Multilateral financial institutions can significantly support the above initiatives funding and technical assistance. This must go hand in hand with equipping local governments and communities with the knowledge and tools to implement resilient infrastructure practices.

Empowering DRI in India presents a great opportunity for achieving sustainable development. A resilient future for India and the world cannot be envisioned without having DRI as its main focal point.

Sumaira Abdulali

The author is convenor, Awaaz Foundation

The Air That We Breathe

Political promises ring hollow as climate change impacts biodiversity and induces unprecedented hazards across the country

As India commenced its prestigious G20 Presidency on December 1, 2022, Prime Minister Narendra Modi identified climate change, pandemics and terrorism as the three "greatest challenges we face". His words brought hope for enforceable action against our climate woes: India is ranked among the most polluted countries in the world and is second only to Brazil in deforestation. Would India's G20 leadership bring relief from our increasing exposure to the felt effects of climate change, including floods, droughts, landslides heatwaves and pollution?

Just two months after India's G20 Presidency commenced, in February 2023, the government's National Clean Air Plan Tracker identified a massive increase in average breathable particular matter (PM 2.5) in the comparable months of February 2021 and February 2023: From 92.7µg/m3 to 164.4 µg/m3 in the Bandra-Kurla Complex (BKC) in Mumbai. The safe limit for 24-hour exposure, according to the World Health Organization, is 15 µg/m3 and the initial interim target to achieve this limit in a phased manner is 75 µg/m3. Air pollution has been directly linked to the warming planet and to the climate crisis.

ANSHUMAN POYREKAR/HINDUSTAN TIMES VIA GETTY IMAGES

A Metro station being constructed at Mumbai's BKC. The area has seen a sharp rise in dust pollution due to construction of infrastructure and residential buildings

BKC has been the focus of major infrastructure and private building for over a decade, mostly undertaken without mitigation measures to control pollution. Dust surrounding the Mumbai Metro 3 project, whose construction has continued for the last seven years, layers the street and visibly darkens the sky. Although funded by the Japanese International Cooperation Agency and promising world-class infrastructure, the environmental safeguards during construction remain primitive, and the health risks they pose would likely be impermissible within Japan itself.

Other private and public building projects without mitigation measures have also contributed to the pollution crisis and severe health problems of residents of the area. BKC resident Radha Rajadhyaksha described her elderly mother's suffering. "Last February, my 80-plus mother went down to our colony garden sit-out. She immediately caught a bad cough, which lasted for two months, and stopped all further outings. I realised the air was thick with dust thanks to the construction going on all around us, especially from residential towers being constructed by Adani Realty next door. Most senior citizens had stopped going down at that point because of the ambience."

The air pollution crisis at BKC abated during the rainy monsoon months and it was the venue of the three G20 meetings held in Mumbai in July 2023. During this same time, the Earth experienced its hottest month in recorded history, with unprecedented heatwaves in Europe, North America and South America, prompting UN secretary general, António Guterres to lament "the era of global boiling has arrived".

As July ended amid worldwide, unrelenting heatwaves, the Lok Sabha passed a controversial amendment to the Forest Conservation Act on July 27. The amendments provide exemptions from environmental safeguards to certain strategic projects if located within 100 km from the international border. This withdrawal of legal protection will particularly impact the densely forested northeastern states.

Ravi Chellam, conservation scientist, CEO, Metastring Foundation, and coordinator, Biodiversity Collaborative, explained that many of the forests at greatest risk are "located in the Himalayas and are habitats which are very rich in biodiversity.

The amended Act has done away with the forest clearance process for defence-related projects in these areas which would have ensured a detailed case by case examination of the potential environmental impacts of these projects and put in place mitigation efforts. Without the detailed assessments it is quite possible that, from now, these projects would result in significant losses of biodiversity."

India, home to some of the most biodiverse rainforests in the world, also has among the highest deforestation rates in the world, second only to Brazil. Rapidly increasing mining for coal and other minerals, stone quarrying and infrastructure development are leading causes of deforestation. Already, areas where irreplaceable forests are being destroyed, including the Himalayas and Western Ghats, are being devastated by climate events: Landslides, floods, droughts have displaced, wounded or killed hundreds of people over the last several years.

Just one day after the passage of the controversial amendments to the Forest Act, on July 28, the G20's Environment and Climate Ministers' Meet concluded in Chennai without consensus on key issues such as phasing down polluting energy sources like coal and other fossil fuels and drew criticism from the EU and its constituent countries.

The G20 Environment and Climate Ministers' Meeting Outcome Document and Chair's Summary concludes: "We note with concern that global ambition and implementation to address climate change remain insufficient to achieve the temperature goal of the Paris Agreement to hold the increase in the global average temperature to well below 2°C above pre- industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels."

"There are some issues about energy and target-oriented issues," MoEF Minister Bhupender Yadav acknowledged in a press conference.

The UNFCC (CoP26) in Glasgow brought together 120 world leaders and over 40,000 registered participants, including President of the USA Joe Biden and Prime Minister of India Narendra Modi, and urged participant countries to make ambitious commitments to meet net-zero by 2030. However, India's commitments pushed the date forward to 2070, beyond the tenure of current leaders, even as India increased coal usage and extraction, deforestation and other activities escalating climate change prior to 2030.

The recently-concluded CoP27 in Egypt brought greater awareness about water and reiterated CoP26 commitments of net-zero by 2070 even as the ecosystems of the Himalayas and Western Ghats, sources of many great Indian rivers, suffer further destruction. CoP28 in the UAE follows soon after India's G20 leadership role, with climate as one of its focus areas, concludes.

However, Modi said in a recorded statement in March 2023: "The experience of the last few years—financial crisis, climate change, pandemic, terrorism and wars—clearly shows that global governance has failed."

While statements of future intent, present policy and grassroots implementation remain in opposition to each other; while the fastest-developing countries like India accelerate the catch-up to aspirational development models of the Global North, we are inadvertently also racing to catch up and add to the pollutants they released historically.

While countries like India accelerate the catch-up to development models of the Global North, we are also racing to catch up to pollutants they released

Historic pollutants have triggered the global climate crisis. While the Global North is cleaning up their own local environments, we in India rank high among those most at risk from the health effects of pollution and of life-threatening climate events.

As we await the Summit of India's G20 Presidentship in September 2023, timely grassroots implementation towards our own climate ambitions will define the success of India's leadership role in limiting the climate crisis. Our planet's climate emergency is here. It is now.

How India is taking UPI global

As UPI takes its first steps in going international, a look at what that entails

By SAMAR SRIVASTAVA & SALIL PANCHAL

ILLUSTRATION: CHAITANYA DINESH SURPUR

An Indian tourist in Singapore can now seamlessly pay via UPI (United Payments Interface) for a coffee purchased or even a television. The National Payments Corporation of India (NPCI) International has tied up with Singapore's PayNow and transferring money on the PayNow Virtual Payment Address (VPA) will be similar to a domestic transfer on UPI. All a traveller would have to do is scan the QR code, enter his or her PIN and have the money debited via their app from their bank account.

The move to accept payments in Singapore and other countries like Bhutan and Nepal is significant not only due to their economic links with India but also on account of the fact that UPI is being increasingly seen as a peer-to-global payment network. (It still has a long way to go before it gets there, though). Global payment networks are divided into three categories. There is Visa and Mastercard, accepted worldwide but with a dominant presence in north America and Europe and the China-based closed loop networks Alipay and WeChat Pay. And UPI.

"There was a time before the pandemic when we were asked to take a look at the strides China had made in the payments space. That is no longer the case as UPI is mentioned in its own right," says Parag Rao, country head, payments business, HDFC Bank.

Since its launch in April 2016, UPI has become the dominant payment system in India. The Reserve Bank of India's observation in its June 2023 bulletin—based on PwC data—that the UPI is expected to account for 90 percent of retail digital transactions volume in the next five years, up from 75.6 percent in FY23, is proof of the domination that it commands over the system.

In volume terms, UPI has grown 59.2 percent year-on-year to ₹9.33 billion in June 2023 and 45.5 percent in value terms to ₹14,75,464 crore, from a year ago. This has only expanded to ₹9.96 billion in volume terms and ₹15,33,536.44 crore in value terms, for July.

In a press conference post the announcement of the monetary policy on August 10, RBI Governor Shaktikanta Das said there has been interest from Western countries, including Japan, and that the internationalisation of UPI is work is progress.

In India, UPI has seen expanding use cases. It has been leveraged to deploy RuPay (an Indian multinational payments system) and UPI, through payment solutions, outside of India. There has been talk of linking domestic credit cards to UPI and then enablement of credit for Indian customers via UPI. On the acceptance front, merchants prefer to receive payments via UPI as QR codes are cheap to deploy as against point of sale (POS) machines that have costs that are ultimately passed on to the merchant.

But it is on the international

UPI goes global: Adoption in different countries

Jul-21
Bhutan
Royal Monetary Authority of Bhutan

Aug-21
Malaysia
Merchantrade Asia

Sep-21
Singapore
Monetary Authory of Singapore, PayNow

Sep-21
Singapore, Malaysia, Thailand, Philippines, Vietnam, Cambodia, Hong Kong, Taiwan, South Korea, Japan
Liquid Group (cross border digital payments provider)

Nov-21
UAE
Network International

Feb-22
Nepal
Gateway Payments Service, Manam Infotech

Apr-22
UAE
Lulu Financials, Neopay (Mashreq Bank)

Jun-22
France
Lyra Network

Aug-Sept 2022
United Kingdom
Terra Pay, PayXpert

Oct-22
Netherlands, Belgium, Luxembourg, Switzerland
Worldline

Oct-22
Oman
Central Bank of Oman

Oct-22
UAE
Central Bank of UAE

Apr-23
London, UK
PPRO

Jul-23
Sri Lanka
Lanka Pay

SOURCE India Briefing, media reports

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front where NPCI International has its task cut out. It is working on a long-term strategy of making the payment network known and accessible. It already has a lot going for itself. There are developing economies where the usage of cash is high. On the other hand, the deployment of POS machines is expensive. India presents a low-cost alternative that can be scaled easily. It is with this agenda that NPCI decided to take UPI international.

HOW UPI'S GLOBAL TRANSACTIONS WORK

In setting up UPI abroad, the NCPI has followed a two-step approach. "When we go outside [India], there are two key areas of focus. One is building interoperability with India and that means two things—creating opportunities for travellers from India when they go to international markets, giving them the option to scan their UPI apps and make UPI payments," says Ritesh Shukla, CEO, NPCI International.

"The other part (step two), that is more long term, is helping other countries create UPI-like ecosystems. We prefer to work with central banks or central bank authorised entities and create a relevant proposition which not only includes technology but also the business knowhow," Shukla adds.

The way an international UPI transaction works is like this. There would be an acquiring bank in Singapore. The payment would be routed via the domestic payment pipe (in this case PayNow). The system would then be designed to talk to the Indian system UPI and it would then get routed to the Indian bank via the UPI network and then to the customer's account, explains Rao of HDFC Bank. The settlement of the transaction would happen in the reverse order.

The second use case is for the 30 million strong Indian diaspora in the Middle East, Southeast Asia

'You'll See a Lot of Marketing Efforts For UPI International'

Ritesh Shukla, CEO of NPCI International, explains that the point of taking the Unified Payments Interface abroad is about driving transactions, not to create rivalry with global networks in India, and speaks about plans of taking the network to other countries of importance

By SALIL PANCHAL & SAMAR SRIVASTAVA

As the Unified Payments Interface (UPI) takes its first steps abroad, *Forbes India* speaks with Ritesh Shukla, CEO, NPCI International, to understand the future plans. On the anvil are plans to increase the acceptance of UPI QR codes by merchants abroad so that Indians travelling can use their Indian UPI apps—BHIM, PhonePe, Paytm, GooglePay—to scan and make payments. The NPCI [National Payments Corporation of India] would also like to enable payments from Indians working abroad who send money back home. And last, there are plans to work with other countries to allow them to develop UPI-like domestic payment systems. Edited excerpts:


Ritesh Shukla, CEO, NPCI International Payments Limited

Q When did you first think of going global and how did you go about it?

Before diving into the specific question, it is important to look at the Indian ecosystem—that is where some people have coined this term, digital public infrastructure (DPI). If you look at the DPIs that we have, infrastructure we have developed in India... they stack beautifully—there is the identity layer, the payment layer and the payment exchange layer. So, when it comes to NPCI, we are sitting on the second layer. The role that NPCI and UPI have played has created a lot of excitement globally. The approach we have taken is adding new use cases and acquiring new customers. So, we are growing on both axes and that multiplier effect is creating traction, new flows, and enabling new opportunities for the ecosystem. As an outcome of this approach, there are beautiful things happening.

There is financial inclusion. There is better money movement that, if I can say, is leading to better tax compliance and faster economic activity. It is leading to fintechs getting new solutions and platforms, and so, many of them are thriving.

A lot of countries around the world are in a similar space [they have high cash usage] and have an evolved telecom sector and a median age like India's [India is 28, Africa is 19]. There is lots that they can learn... and create similar ecosystems in their country. There is a lot that has got us excited, including the recognition we have received internationally. All this has given us the confidence to take homegrown solutions and create this outside India. That is the underlying thought behind us going global.

Q Is the endeavour to have a payment system out of India to rival the two or three global networks we have? Or is it to have a payment system Indians can use when aboard?

Thank you for this question. It allows me to articulate our strategy. First of all, we are not here to create rivalry.

When we go outside [India], there are two key areas of focus. One is building interoperability with India and that means two things—creating opportunities for travellers from India when they go to international markets, giving them the option to scan their UPI apps and make UPI payments. Today, we are live in four countries, but there is work going on for many countries.

The other use case has to do with Indians living abroad. Today, there are 30 million Indians living abroad—in the Middle East and Southeast Asia, and even North America, and they have a need to send money back home. How can we use the core infrastructure we have for UPI to bring that money faster and in a more efficient manner?

The other part that is more long term is helping other countries create UPI-like ecosystems. And our model is that we prefer working with central banks or central bank-authorised entities so that we create a relevant proposition that not only has technology but also business knowhow. Let's be honest... UPI is not the first instant payment platform in the world. But the success of UPI lies in the way we conduct our business. You look at how collaborative our model is—how deeply we are working with fintechs, how we are creating new things on top of the basic platform. So, we are working at the frontier of technology and the world knows the value they have delivered in a complex country like India.

Q Has NPCI given out any data on transactions with QR codes that are scanned abroad or when money comes to India via UPI?

The way things work in payments—we create a lifecycle chart and so while it takes time [initially], it moves like a hockey stick curve later and then it stabilises. That is the usual customer lifecycle. Like you mentioned, we have been in the business for two to three—the reality is that not all systems are designed for one standardised approach. When you are working in such a diverse landscape, you have to create capabilities to not only read the message format coming from the foreign country but also be able to propagate it further within the ecosystem in India. So, we are somewhere in the process of creating a compliant ecosystem and this includes working with banks, fintechs and big techs here in India to be able to support cross-border transactions. At NPCI, we may create these connections, but what if the banks' core systems are not able to read a message format that comes in a currency that is not 356 [356 is the code for Indian rupee]. We are also investing a lot with our partners to be able to train and retrain cashiers etc to offer this to customers as a payment service. So, we are in that process and whatever others have achieved in 70 years of their service, we are working way faster than them. The whole point is about driving transactions. You don't want to create rails and not see any traffic. In times to come, we will be able to share numbers with you.

Q The Reserve Bank of India (RBI) has introduced the digital currency on a pilot basis. Do you see any synergies with the digital currency and UPI?

When you look at UPI, we are all about retail payments, and when you talk about CBDC [central bank digital currency] in India, the RBI is running a pilot with about two to three million people participating. When it comes to NPCI International, our focus is to promote retail payments from around the world using apps from across India—BHIM, PhonePe, GooglePay etc. Right now, we have so much to deliver that we are not thinking about CBDC. Our focus is on retail payments outside India as well as people remitting money to India.

Q What can we expect in the next few years?

You will see expansion of the network as more countries join the merchants' payment network—countries that are relevant where Indians go for tourism or business. We will expand our network to other countries of importance. You will also see efforts on the marketing part. Today, if you go to a store in Singapore, it may be offering UPI, but you may not see the branding and so you may not be prompted to use your UPI apps. You will see a lot of investment in branding. And we would create awareness in India to tell people that when you travel to so many countries, you can use UPI.

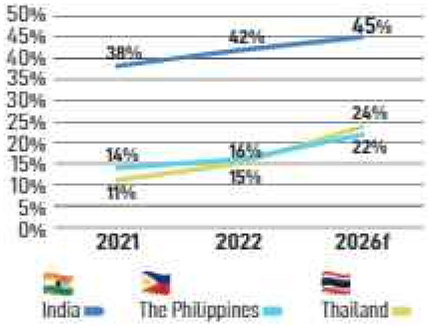
and North America to send money to India. This would once again make use of the network within the country that UPI has tied up with and the Indian UPI network to remit money in a cost-effective manner. In 2021-22, India received $89 billion from inward overseas remittances, so this is another significant market opportunity.

NPCI International will also spend time and energy over the long term to help other countries create UPI-like ecosystems. "Our model is that we prefer working with central banks or central bank-authorised entities so that we create a relevant proposition that not only has technology but also business knowhow," Shukla says.

It is here that UPI could have a significant impact in making the payments network shine globally. Fintech experts say UPI is likely to be found more feasible for small value, low-ticket transactions. "One can look at the scan-and-pay use cases in SE Asia and Chinese wallet applications, like Alipay and WeChat Pay," says Harish Prasad, head of banking with fintech FIS Group. "Singapore has seen tremendous acceptance for scan and pay. People are used to using scan and pay, as long as the transaction is secure and there is recourse in payment," he said.

The rise of RTP is fuelling A2A payments and cross-border commerce across APAC

A2A share of e-com transaction value, 2021-2026f



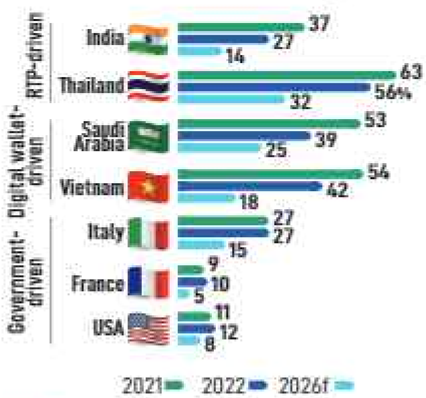
SOURCE FIS Global Payments Report 023

Cash's decline takes different roads

Real-time payments, digital wallet adoption and government policies influence cash's path

Cash share of POS transaction value, 2021-2026f

Figures in %



SOURCE FIS Global Payments Report 023

PROBLEMS WITH SCALING UP

While NPCI International has signed agreements with a host of countries—Nepal, Bhutan, Singapore, UAE, France, Oman to name a few—there is still no data on the number of transactions that flow through as a result of this, either through money being sent back to India or Indians scanning QR codes for local payments in those countries. Shukla points out that once a critical mass is reached, these transactions could see a hockey-stick like growth curve. Still, the refusal to share numbers points to a tacit acknowledgment that there is still some way to go in UPI usage outside India.

In July, Prashanth Aditya Susrala was on a business trip to Dubai. This was a few days after the announcement of UPIs linking with the Instant Payment Platform of the UAE. At the airport and at the shops that he visited he found no buzz of such a service available. He says this is significant as there is a large Indian population in Dubai and the uptake should have been instant.

Shukla of NPCI International acknowledges this and says there will be a lot more marketing efforts over the next few months. Susrala also tried (and failed) to use UPI in Nepal earlier. "The QR infrastructure outside India is not well developed and while, in India, it is interoperable, that is not the scenario in some of the countries outside India," says Rahul Jain, CFO at NTT Data Payment Services India.

Acceptance in India also took a few years to play out—between 2016 and 2019. Digital payments are not likely to slow down any time soon. There are clear signs too that the usage of cash in the Indian economy is starting to slow down.

The Indian digital payments market is expected to touch 411 billion transactions in FY27, from 103 billion in FY23, PwC said in a May 2023 report, with the industry expanding steadily in the last five years at a CAGR of 50 percent transaction, volume-wise and 60 percent transaction, value-wise respectively.

Another issue is that while Indians abroad may prefer to use UPI for low-ticket transactions like restaurant meals or tour tickets, high-value transactions may still happen through credit cards. "This is true even in India as people like to utilise free credit for 45 days so there is no gainsaying the fact that, for a big-ticket item, it makes sense to leverage the credit card," says Raj Khosla, founder of MyMoneyMantra.

Last, there is the issue of the merchant discount rate. How will merchants accepting payments be charged abroad? Unlike India, NPCI International is clear that there will be a fee charged abroad. What that fee settles at remains to be seen. It needs to be low enough to get merchants to steer customers away from card payments and still needs to make a business-use case for banks. Ultimately success or failure would depend on pricing and marketing. On both those fronts, the story is still to play out.

Freshworks & the Age of Efficiency

The current environment in the SaaS sector calls for growing sustainably, experts say, and Indian software companies may have some advantages

By HARICHANDAN ARAKALI

The broad stock market fall in the US on August 15 didn't spare Freshworks, as the tech-heavy Nasdaq fell more than 1 percent for the first time since May.

However, the Chennai-to-San Mateo software company retains most of its gains since the beginning of May when it reported its first quarter of profits as a listed entity. On August 1, when Freshworks reported its June-quarter earnings, the software company improved on its Q1 numbers, posting higher profits on a non-GAAP basis.

This was also the first time Freshworks posted profits in back-to-back quarters since listing in the US two years ago. The company also exceeded analysts' expectations on revenue and earnings, and even raised its outlook a little bit for the full year 2023 from its May 2 estimate.

The day after its Q2 numbers came out on August 1, Freshworks stock jumped to $23.09 from the previous day's close of $18.24—a 12-month high, nearly doubling from the low of $11.92 in early November.

CFO Tyler Sloat was among the directors and top executives who sold some of the stock they'd been awarded. Sloat sold these shares for the first time since the company went public in accordance with a pre-established plan adopted in December 2022. The plan, referred to as the 10b5-1 trading plan, allows insiders of

Girish Mathrubootham, founder and CEO, Freshworks public companies in the US to buy or sell shares in a manner that ensures they don't benefit by privileged information and remain compliant with the securities rules in the US.

Sloat made about $10.5 million, before any applicable taxes and charges, selling 500,000 shares, according to an August 3 filing with the Securities Exchange Commission, the US capital markets regulator.

Freshworks' strong performance has garnered it the "strong buy" consensus on the Nasdaq, based on ratings from 16 brokerages, over the last three months, with an average 12-month price target of $22.6.

And analysts who have a more conservative view, such as Brent Thill at Jefferies, who has a "hold" rating on the stock, have also taken note that Freshworks could be at the start of a longer-term steady growth scenario.

"Better go-to-market execution drove a sequential acceleration in large-customer growth," Thill and his colleagues Luv Sodha and Eylon Liani wrote in a research note to clients on August 2 after Freshworks' Q2 results.

And margins came in ahead as well, showcasing Freshworks's ability to deliver growth improvements and making its operations more efficient at the same time, they added. Freshworks defines large customers as those who contribute $50,000 or more in annual recurring revenue. This segment grew 30 percent in Q1 and 33 percent in Q2 from the same periods a year earlier.

Freshworks' evolution has also had the customary exits one sees at corporate businesses as they grow and change. The company recently confirmed that two senior executives—CHRO Suman Gopalan in Chennai and CMO Stacey Epstein in the US—have quit, independently of each other. These are perhaps the two most high-profile departures at Freshworks after last year's exits of co-founder and CTO Shan Krishnasamy and Chief Revenue Officer Jose Morales.

Customer Metrics

	Q2-22	Q3-22	Q4-22	Q1-23	Q2-23
YoY Growth	22%	19%	20%	18%	18%
YoY Growth CC*	25%	23%	21%	19%	17%

	Q2-22	Q3-22	Q4-22	Q1-23	Q2-23
YoY Growth	42%	36%	35%	30%	33%
YoY Growth CC*	48%	44%	38%	33%	32%

*Note: Growth rates adjusted for constant currency are based on exchange rates in effect as of the comparison period end for currencies other than USD

THE LONG VIEW

"We like FRSH's large, underserved TAM of $76 billion in four markets, which represents a long runway for growth," the Jefferies analysts write in their report. FRSH is Freshworks's stock symbol on the Nasdaq exchange. TAM is total addressable market.

The bulk of the addressable market (76 percent) comes from SMBs with 1-250 employees, which is the company's sweet spot. And Freshworks has "multiple levers" to keep growing at 20 percent or more, they write.

These include its ability to add new customers (it has added more than 1,500 customers per quarter), expanding by adding more users at existing customers, selling more products and features within its suite of product lines, international growth, and adding new products within the front-office apps space, such as commerce, integration, and analytics, they write.

Some specific customer behaviour trends, across SaaS vendors, have influenced Freshworks' performance. Over the past 18-24 months, there's been a noticeable consolidation of tools and renegotiation among customers, says Sa'ad Kaleem Shaikh, lead–innovation, at the consultancy Zinnov, and co-author of its annual report on India's SaaS sector.

This trend is reflected in the success of companies like Zluri and Spendflo, specialising in SaaS app management and contract renegotiation. In this context, Freshworks has demonstrated the ability to effectively expand beyond IT service management and CRM (customer resource management) into various other business functions, Shaikh says.

"We're seeing a lot of organisations renegotiate their contracts with Salesforce and trying to reduce their spend," says Ray Wang, founder and principal analyst at Constellation. Some of this benefits smaller players like Zoho and Freshworks, he adds.

Customers are repurposing the same product for different areas, contributing to its versatility. The trend towards budget consolidation, with a preference for comprehensive suites, has worked in Freshworks' favour, Shaikh says.

While TAM is one thing, Freshworks is succeeding in expanding its "serviceable" market and market share in a competitive environment, outperforming some of the larger players, he says.

And the company's strategy to win larger customers can be seen even in India: Freshworks' customers include PhonePe and Paytm, and it has seen an uptick in business from Mahindra Group and Sonata Software, he says.

"This strategic move has led to substantial dividends as they continue to operate at the same cost, same spend structure and benefit from increased average contract values," Shaikh adds.

That said, Freshworks CFO Sloat told analysts that he doesn't expect net dollar retention to improve during the rest of the year—an important metric in the SaaS sector. In fact, he expects it could be as much as 2 percentage points lower than the 107 percent the company reported for Q2, due to an anticipated increase in customer churn amid the ongoing global macroeconomic slowdown.

In particular, in the area of customer experience, businesses are prioritising cost savings and keeping a check on net new agent additions, Shaikh says.

A year earlier, net dollar retention rate, which is one indicator of a SaaS company's ability to retain and expand business through the sale of subscriptions to its software, was 115 percent for Freshworks. Thill at Jefferies expects that the current levels reflect a "normalisation," meaning he doesn't anticipate further big decreases. "Freshworks recently implemented a marginal 4 percent price adjustment in its IT suite for new and existing customers," winning favourable response, Shaikh says.

At SaaS bellwether Salesforce, fiscal fourth-quarter growth was at 17 percent for the three months ended January 31, compared to 27 percent for the same quarter a year ago. The slowdown is across the sector.

YEAR OF EFFICIENCY

Some experts argue that the current macro environment will help India's SaaS sector because the country's best software companies have a more extensive playbook now than five years ago, when it comes to pulling together the best of build in India and sell in America.

"2023 is the year of efficient entrepreneurship. We believe that in the current macroeconomic climate, there is a significant premium on efficiency," Anant Vidur Puri, a partner at Bessemer Venture Partners, said in a press release on August 8, when the firm released its latest report on India's SaaS sector.

Non-GAAP Income (loss) from operations

($ in millions)

Notes: 2023 financial data reflects unaudited results as of June 30. See Appendix for reconciliation of all GAAP to Non-GAAP financial measures

"Indian companies—which are fundamentally more efficient than their global counterparts—have a significant advantage, and this will be a major tailwind in their journey towards becoming global leaders," Puri added.

Bessemer, one of the oldest and biggest VC firms in the world, has an optimistic thesis about India's software products companies. Its latest report projects the sector to grow from $13 billion in sales in 2022—and Bessemer includes India's fintech software providers in its SaaS projections—to $50 billion in 2030.

The efficiency advantage comes from "a culture of effectiveness and a multi-product strategy", according to Puri.

At Zoho, the only billion-dollar-revenue software company from India, a multi-product strategy is critical to getting more business from customers, according to co-founder and CTO Shailesh Kumar Davey, as cited by Bessemer.

The strategy allows Zoho to sell solutions for more business problems within a vertical and then tap adjacent opportunities, allowing for horizontal expansion, Davey says.

At Freshworks, CEO Girish Mathrubootham is pursuing a strategy of infusing generative AI, and artificial intelligence (AI) tools in general, across the company's product portfolio. This could potentially make the products cheaper to use as well, because a particular function might require fewer human staffers, but Mathrubootham is betting customers will buy more of his software and also pay a premium for the AI features.

One signal in that direction is the $29/per agent/month pricing that Freshworks plans to offer for its AI assistant Freddy Copilot. That tariff "represents a 20-35 percent uplift to the Enterprise SKU pricing depending on the product", the analysts at Jefferies note.

"AI will change how much software we procure," Wang at Constellation Research says, adding that licenses are going from the per-user-per-month model to consumption or processing based meters. At Freshworks, Mathrubootham and his top executives told analysts on August 2 that there is an ongoing effort to move more customers to annual contracts.

To be sure, it's early days to say if Mathrubootham's AI-led strategy will pay off, the analysts at Jefferies say.

An improvement in the macro sentiment, whenever it comes, can only help. While the market has been pulling back hard in the first half of the year on technology spend, "over the last two weeks we have seen an uptick in customer sentiment", Peter Bendor-Samuel, CEO of Everest Group, an advisory, said in an email on August 2.

This "looks like it is signaling that the market has bottomed out and we have a modest increase in spending", he added.

INFOGRAPHICS: MUKESH SINGH

Pivot to Profitability

A funding winter, tighter credit markets, slower consumer spending, and a global tech stock rout are forcing startups to abandon the growth-at-all-costs mentality and rework business models to focus on sustainable profit

By VARSHA MEGHANI

SHUTTERSTOCK

"For five years, not one investor asked me when or how we would be profitable. That's how easily money was flowing. It was crazy. Now every VC only asks when we will be profitable," says a startup founder.

Meanwhile, Zomato, whose stock price plunged 26 percent since listing, reported a surprise profit after tax (PAT) of ₹2 crore in the three months ended June—a first in the online food delivery giant's 15-year history. In fact, a deferred tax of ₹17 crore led to the single digit PAT figure; profit before tax stood at ₹15 crore.

A few days later, social commerce platform Meesho, backed by Prosus, SoftBank and Sequoia, said it had turned PAT positive in July, helped by a 70 percent drop in customer acquisition cost, from roughly ₹250 two years ago to ₹50-60 today. Although Meesho, which recorded a loss of ₹3,251 crore on revenues of ₹3,232 crore in FY22, still has a long way to go, the signs are upbeat.

"The Indian startup ecosystem is making a hard pivot from growth to profitability. Startups and their investors are adapting, redefining priorities, and embracing new business models and cost efficiency," says Mohit Rana, partner at RedSeer, a Gurugram-based consultancy.

The reasons for this "hard pivot" are many—higher cost of capital, higher interest rates, a decline in the value of technology stocks globally and in India, the recession in developed markets and an overall slowdown in consumer spending. But the most significant is that VCs are less willing to dish out cash. Consider how startup funding peaked to $50 billion in FY22 and dropped to $15 billion in FY23, as per RedSeer. That's a 70 percent nose-dive.

As a result, startups—once encouraged, and even incentivised, to remain loss-making to gain market share—are spending frugally, reworking business models and focusing on sustainable profit.

Paytm's stock took a beating on listing day falling 27 percent. It has since been clawing its way up by making significant improvements over the last few quarters to improve its contribution margin. So much so that it hit Ebitda positive before ESOP costs in the three months ended March, two quarters ahead of target. The stock is up more than 60 percent since the start of the year.

Even startups that grew quickly during a pandemic-fuelled tech boom are now focusing on unit economics. Zepto, for example, raced to a near-unicorn $900 million valuation in less than a year of founding in May 2022. Aadit Palicha, co-founder and CEO, told *Forbes India* earlier that Zepto's expenses as a percentage of sales are almost 10x lower than in FY22 when the startup reported a net loss of ₹390 crore on revenues of ₹142 crore. "It's all about driving better and better operating discipline and making the unit economics work," he said.

Meanwhile, newbie startups, born in the era of less money, have frugality built into their DNA. Consider how Manas Madhu, founder and CEO of Beyond Snack, which sells banana wafers under the brand name Kerala Banana Chips, says he "didn't even dare" to spend money on marketing until he was "absolutely certain" about the product's viability and demand. "We validated product market fit, ensured repeat sales and automatic market pull for the product, and healthy gross margins. Then we knew we had a sustainable, scalable model in place. Only then we spent on marketing—that helped keep the CAC low," says Madhu. Beyond Snack, which has a presence in 8,000 offline retail outlets and sells online, is currently hitting ₹3 crore in monthly revenue and is profitable.

"In the past we have seen many companies try to hit profitability, but everybody took a lot longer to get there. But in this current crop, in the last two years, I am seeing that momentum towards profitability has been much faster than what we had seen in the past 10 years," says Abhishek Goyal, co-founder of Tracxn, a data provider.

He adds, "There used to be a lot of scepticism about whether India will ever be a large enough market. I see the Zomatos and Meeshos coming close to profitability as a landmark event. It's as though we have turned a corner saying that at this per capita income we are not losing much money to create the market. That for me is a coming of age."

Startups, once encouraged to remain loss-making to gain market share, are spending frugally and reworking their business models

RedSeer analysed around 100 unicorns and found "substantial improvement" in profitability between FY21 and FY22, says Rana. While only 22 percent of the unicorns analysed had a clear path to profits in FY21, the number rose to 40 percent in FY22. Also, around 53 percent of unicorns are expected to become profitable by FY27, while 20 percent are likely to pivot to new models, get acquired or wind up.

The disruption caused by Covid and punishing of loss-making tech company stocks at the time of listing helped the ecosystem, he says. "It led entrepreneurs to think hard on what their core business is and defocus on the other things," says Goyal.

Ninad Karpe, partner at 100X. VC, concurs. "Covid has changed the thought process" of founders and VCs alike. "They are now sharply focussed on strong execution, not just momentum. By execution I mean doing everything to achieve sustainable growth, not just growth for growth sake," he says.

Karpe is also long on the "multiplier effect" of India's strong public digital infrastructure, including ONDC, the rapid growth of ecommerce in Tier II and III towns, and the fact that devices like laptops will be available for as little as ₹16,000, thanks to JioBook. "You put all this in a pot and what comes out is a potent mixture which will only help our startups grow and scale in the medium to long term," he says.

Globally, total venture funding in 2022 dropped by more than 30 percent, to $415.1 billion, although deal volume fell by only 4 per cent, according to CB Insights. Here too companies are forgoing growth at all costs to focus on profitability.

Yet dry powder is at its highest. India-focussed funds were sitting on the highest-ever unallocated capital at $23 billion in 2022, according to a BCG, Times Bridge and TiE report. It noted that the funds would mostly be deployed towards early-stage startups in 2023, with investors exhibiting "patience" and a "focus on profitability metrics" with growth and late-stage startups.

"I think the term funding winter is not universal or ubiquitous in its application. The right folks with the right execution model and scalable business will not find it difficult to raise funds," says Karpe.

(WITH INPUTS FROM HARICHANDAN ARAKALI)

Bank More to Gain More

Axis Bank might have irked customers after its recent devaluation of reward points on its credit cards, but its message was clear

By SALIL PANCHAL

Axis Bank has a wider expectation from its credit card customers. The bank has faced criticism from them after it decided to devalue some features on five of its cards. This meant the benefits, rewards and advantages offered on that specific card will diminish over time.

But the bank has a clear perspective on how it wants to engage with its customers. In the post-Citi-acquisition of its consumer banking business, including credit cards, its reach and customer base of cardholders has grown. But it now needs to climb up the ranks in terms of share in card spends (see chart), which is why the restructuring of rewards and points had to take place, analysts say.

Some of the measures for the Axis Bank Flipkart co-branded card have kicked in from August 12 while others for the Axis Bank Magnus card will come into effect on September 1.

In the case of the Axis Bank-Flipkart card, one can earn a cashback of 1.5 percent by using the card to pay for travel-related expenses on Flipkart. But one cannot earn a cashback on fuel purchases, gift card purchases made on Flipkart and Myntra and EMI transactions from this date onwards.

In the case of some of the features on the Axis Bank Magnus card, the bank also saw "very high usage" which got the bank to think that this accelerator burn would be difficult to sustain for a long term. Hence it introduced some changes.

Banks altering reward points and benefits is not something new. In May, SBI Cards and Payment Services had said it was discontinuing the [5 percent] cashback on services like jewellery, utilities, school

The bank's changes in the rewards points are focussed towards the high spender

DANISH SIDDIQUI / REUTERS

and educational services, and insurance besides other outlets.

In Axis Bank's case, while these actions have impacted customer sentiment, it is also the change in the terms and conditions relating to reward points on Axis Bank's Magnus credit card, which has irked them the most.

From September 1, on the Axis Bank Magnus card, the monthly milestone benefits of 25,000 EDGE reward points on monthly spend of ₹1 lakh will be discontinued. This card earlier offered 25,000 EDGE reward points worth ₹5,000 on monthly spends of ₹1 lakh.

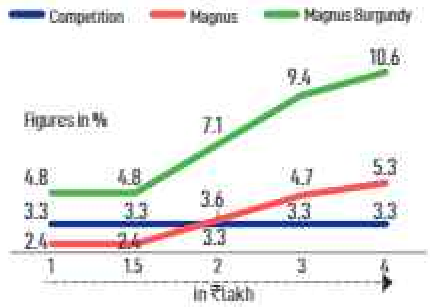
From September 1, Axis Bank Magnus credit card customers can earn 12 EDGE reward points for every ₹200 on cumulative spending up to ₹1.5 lakh. They can earn 35 EDGE reward points for every ₹200 on monthly spending above ₹1.5 lakh. This, the bank argues, is the highest earn ratio in the industry (see chart).

"Magnus continues to be a market-winning proposition. If anything, with the higher earn ratio (35 points per 200 beyond ₹1.5 lakh of spends), it becomes even more rewarding for customers spending more," Moghe says. Spends done in August will be eligible for monthly milestones and the bank has said that reward points for eligible customers will be posted within 90 days as per the normal time frame.

Also, from September 1, the transfer ratio to convert reward points to airlines and hotel loyalty programmes for Axis Magnus cardholders will be 5:2, compared to a previous 5:4 ratio. This means for 50,000 reward points, you could now get 20,000 air miles, compared to 40,000 miles earlier.

The hook here for customers is that they could still avail of the earlier 5:4 feature on points if they consolidate their banking operations with Axis Bank. Also, the rewards as a percentage of spends (see chart) double if the customer becomes a Magnus Burgundy one.

Rewards as a percentage of spends



SOURCE Forbes India

Credit cards CIF share

Credit cards spends share

SOURCE RBI

A Burgundy programme with Axis Bank entails maintaining a minimum balance of ₹10 lakh in the savings account or a total relationship value of ₹30 lakh or receiving a net salary account credit of ₹3 lakh each month, besides other conditions.

So at a broader level, the key message being sent out to existing and new Axis Magnus card holders is that if you want same acceleration (earn), then deepen your relationship with the bank. Moghe says in the bank's card portfolio, customers were already spending significantly beyond ₹2-3 lakh per month. "It becomes more powerful for them."

Additionally, Axis Bank has taken action to ascertain the authenticity of some transactions on the Magnus card. "A small section of customers was trying to exploit the rewards programme to achieve the ₹1 lakh spends threshold by making large, frequent, commercial transactions or peer-to-peer transactions, which are not permitted as per our card's terms and conditions," Moghe says.

With the acquisition of Citi's consumer banking business, Axis Bank's cards portfolio is now of 1.2 crore. Through the acquisition, it has been able to deepen its presence in the top eight cities. Axis was strong in the mass affluent and emerging affluent market segments, while Citi's customers are in the affluent and super affluent segments.

The bank's changes in the rewards points are focussed towards the high spender. "Axis is inviting customers to spend more and more to cross the threshold. RBI data shows that spends for Axis Bank remain comparatively lower to other banks, so the strategy is to increase spends and cross-selling of other products," says Nitin Aggarwal, head of BFSI at Motilal Oswal Financial Services.

Axis portfolio spends have grown by 56 percent in FY23 as compared to FY22. Its growth in the credit card segment is good and its reach has also improved after the Citi acquisition. But it figures lower in the spends share, where it will need to catch up with the leaders such as HDFC Bank and SBI Cards.

The true test of how loyal Axis Bank's card customers are—after the July devaluations—will be seen in the coming months, starting with the upcoming festive season. The bank promises there will be attractive features in its cards' product line. But customers will, in all probability, need to keep spending more to see benefits. After all the maths involving the reward points, one content creator tweeted on July 21: "*Itna* complications *nahi chaiye* life *mey*. [Don't want so many complications in life]. Axis you can keep your points, I will keep my sanity."

INFOGRAPHICS: MUKESH SINGH

New Kid on The Microfinance Block

With consistent growth and new business lines, Fusion Microfinance adds to the list of investible companies in the sector

By SAMAR SRIVASTAVA

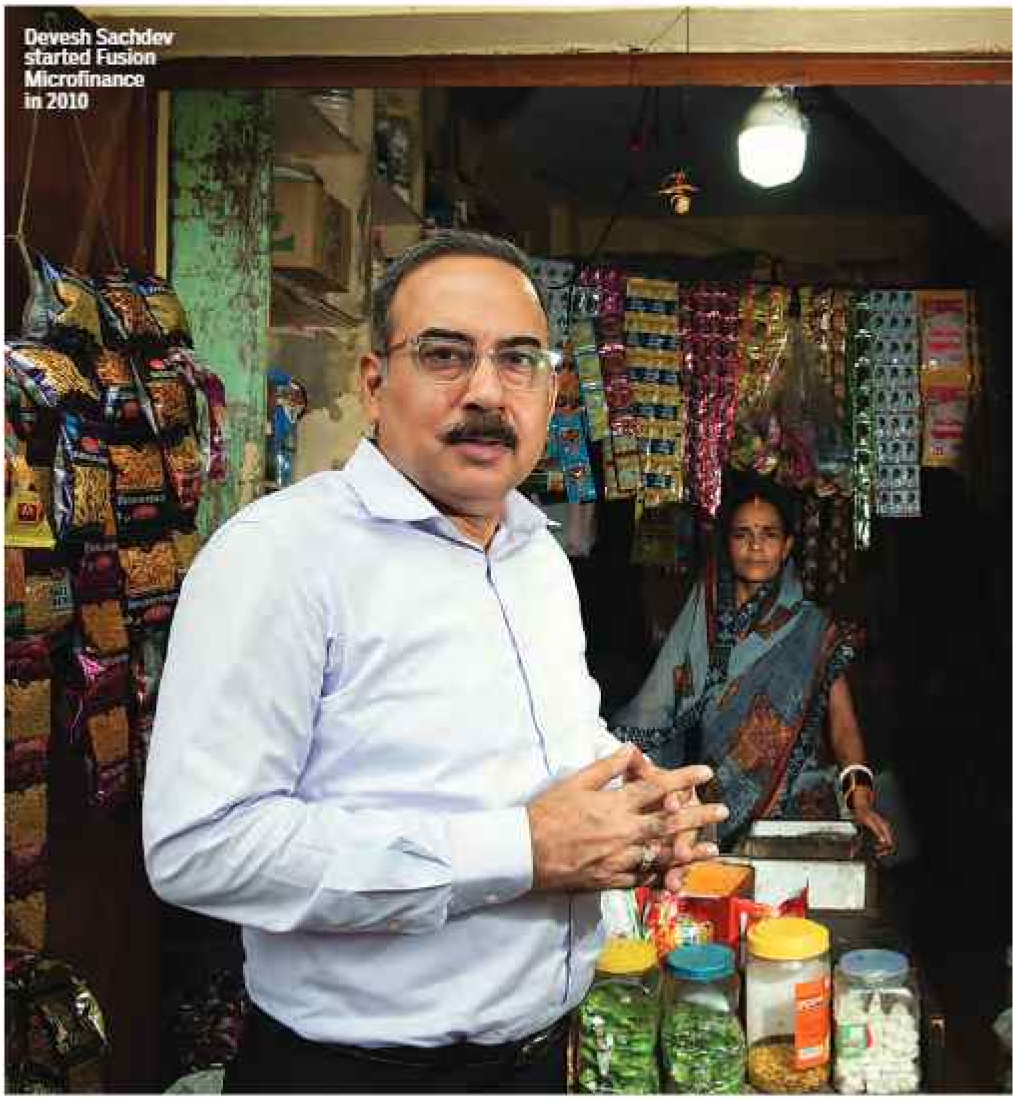
A little over half-way through my interview, Devesh Sachdev makes an off-the-cuff remark that speaks wonders for the confidence he has in his business. "Any of my employees would be willing to sign the balance sheet," says the managing director of Fusion Microfinance. In a finance company this confidence is significant. Over the last decade, there have been numerous instances of fudged numbers by companies, auditors signing off and then resigning, and independent directors resigning when they are uncomfortable with the numbers reported.

In a business with few hard assets, cooking the books is easy, and Sachdev is clear that is a problem Fusion will never face. "I wanted to build a good company. Not [necessarily] a large company," he says.

It is with this endeavour that Fusion Microfinance has emerged as the second-largest listed company in India in the microfinance space. After a successful listing in November 2022, the stock has been on a tear. It is up 63 percent from its listing price to ₹599 a share, taking its market cap to ₹5,960 crore; the stock trades at 2.6 times book value. In comparison, CreditAccess Grameen, which has a market cap of ₹22,963 crore trades at 4.6 times book value. As the market sees more quarters of its performance, Fusion's stock may re-rate further.

The company has put in place strong growth levers. Its recent Q1FY24 numbers saw asset under management (AUM) grow to ₹9,711 crore, up 31 percent in the last year. At ₹120 crore for the quarter, profit after tax was up 60 percent. The business had a return on equity of 20. 1 percent and a return on assets of 4.9 percent.

The company is also trying to show that microfinance investments can make for consistent compounding. The sector hasn't been a happy hunting ground for investors and



Devesh Sachdev started Fusion Microfinance in 2010

AMIT VERMA

there is still a lot of scepticism on whether companies can perform through cycles. They stumbled during demonetisation and then during the Covid-19 pandemic. But still, the largest CreditAccess has compounded at 29 percent a year since its August 2018 listing and now with Fusion's performance (although over a much smaller time period) investors may be getting some confidence in the sector.

"We always believed we were doing a deep discount IPO but we did it because microfinance as an area needs to get more evangalised before it gets mainstream," says Narendra Ostawal, managing director at Warburg Pincus, an investor in Fusion Microfinance. "Until you have three to five listed players with a good history of performance it will not create a strong market for these companies."

> **"The first thing we did right was start our operations from Uttar Pradesh and Bihar."**
>
> **DEVESH SACHDEV,**
> Managing director, Fusion Microfinance

Fusion's performance also comes against the backdrop of low asset quality stress in the microfinance sector. What remains to be seen is whether the cycle, where borrowers default on their loans during hard times, repeats. For now, after losses during the pandemic, where lenders saw gross non-performing assets (NPAs) rise to as high as 7 percent of their AUM, asset quality in the sector has improved dramatically. Net NPAs at Fusion are down to 0.78 percent in Q1FY24 results. What remains to be seen is how the portfolio performs in another downcycle. On its part, Fusion says it is putting in place systems to ensure early warnings of stress. More on that later.

THE EARLY DAYS AND SCALING UP

In the early part of the last decade, the Indian countryside was ripe for microfinance companies. Five years of rural employment guarantee had pushed up incomes and entrepreneurs were willing to start small businesses. Finance was an issue, but Bandhan and SKS Microfinance had shown it was possible to lend to such borrowers and set up a viable business. Undivided Andhra Pradesh had become a success story as far as microfinance was concerned. (Problems would surface later and microfinance activity was banned in Andhra Pradesh and Telangana. The ban was lifted in February 2023.)

It was against this backdrop that Fusion Microfinance—it was named Fusion as a portmanteau of the words financial and social—started operating in 2010 in states where no one had ventured till then. "The first thing we did right was start our operations from Uttar Pradesh and Bihar," says Sachdev. There were naysayers who thought his strategy of being diversified across north India with rural branches was a recipe for disaster.

But Fusion persisted by working carefully on the joint liability group model, where members are jointly liable for each other's loans, and managed to grow organically. Importantly, they showed that it is possible to have a presence in Uttar Pradesh and Bihar and still have a good portfolio. Another recent listing, Utkarsh Small Finance Bank, also started in Varanasi in Uttar Pradesh and has grown consistently. Utkarsh listed in July 2023 and was up 92 percent on listing day.

As the business grew, Fusion realised that managing risk was as important as growth. Sachdev put levers in place to ensure that a down cycle doesn't take down the company. For starters, he diversified the portfolio. The company now operates in 20 states and has made sure it keeps a lean portfolio in states like Assam and West Bengal where microfinance lenders have had problems with collections. For instance, in Assam their loan book is just ₹36 crore.

In addition, Fusion has instituted district caps. Time and again lenders get excited when a business in a particular geography is growing rapidly and then suffer during a down cycle. At Fusion no district accounts for more than 3 percent of loans, along with caps on the number of customers in a village. At the top, five states make up 65 percent of the portfolio.

In April 2022, the Reserve Bank of India (RBI) announced new guidelines for microfinance companies, which have further taken

Fusion at a glance

The company is the second-most valuable listed microfinance entity

AUM
₹9,711 cr

Return on assets	Return on equity	Cost of funds
4.99%	20.2%	10.57%

Number of states	Number of districts
20	399

Market capitalisation
₹5,960 cr

Customers
3.64 mln

Source: Company Investor Presentation

risk off the table. Now, loans of up to ₹300,000 for a household can be classified as microfinance loans. This has increased their addressable market. In addition, companies can lend 25 percent of their portfolio for non-microfinance activities. This has made it easier for companies like Fusion, and Sachdev has been clear he doesn't want to grow the business by increasing the portfolio size of ₹25,000 per customer.

Still, analysts say that this lending could also entail risks. "While microfinance companies can now lend up to 25 percent of their portfolio for non-micro finance activities, the risk levels for this kind of lending remain if you are serving the same borrower," says Jindal Haria, director, India Ratings.

At present, Fusion has 1,103 branches across 20 states and 3.64 million active clients. This has enabled the company to grow rapidly with compounded sales and profit growth in the last five years of 46 percent and 64 percent respectively. Sachdev prides himself on the fact that his team—the chief finance officer and compliance officer—have stayed with him for a long time. This was also a point that Warburg noticed when they invested in the company.

"Scale is a factor of how strong your middle management is. Top management is focussed on the big picture and front-line staff has high attrition anyway," says Ostawal. "But it is the cluster managers and area managers that really drive the scalability of your business and the way they were conducting their business meant that Fusion was a fabulous platform in the making."

EARLY WARNING SYSTEMS AND MSME LENDING

The cyclicality of the microfinance sector has often vexed investors who want growth but with dollops of predictability. This is something Sachdev is keenly aware of, saying, "[The] market has become smarter and the market wants to see consistency. They look at guidance, portfolio quality and profitability together."

One way in which Fusion can achieve this is by putting in place an early warning system. After 12 years on the field, the company has collected data on its borrowers. A large number of borrowers also have credit scores. This allows them to segregate borrowers and states as per risk. Assam, West Bengal and Haryana are tagged as high-risk states, while Uttar Pradesh, Madhya Pradesh, Bihar and Tamil Nadu are low-risk; Chhattisgarh and Odisha fall under medium-risk.

Fusion has run these models to see what would have been default rates if they had been able to use these models in 2021-22. As a result, they are confident of weathering the next downturn better. The data now provides information on when they need to focus on a particular customer or a particular district and step up monitoring efforts. It also allows them to see when a loan enquiry is made from competition.

And lastly, there is the diversification to lending to micro, small and medium enterprises (MSMEs). This has been touted as a new sunrise sector and lenders are now able to triangulate information from credit scores (for companies) and their GST returns, as well as data from account aggregation services to assess creditworthiness of companies. Fusion has created a ₹350 crore book since 2019 across 12,000 SMEs.

Sachdev says that if customers want a bigger loan the company moves them to MSME lending as he doesn't want to take loan sizes in the micro finance portfolio higher than the current ₹25,0000. "That way we are not losing a market opportunity but they can do more adjacencies," says Sachdev. He has also made sure that these small business loan branches are different from microfinance branches.

An industry analyst who declined to be named cautioned against scaling up this business too fast. While there is no doubt the opportunity is huge, the company has to give itself time to understand these new customers. The company has already had one round of learning and is pivoting its portfolio towards secured loans.

As Fusion scales up, it would be interesting to watch if it manages to keep its portfolio quality in check. A successful showing on that front would make the sector investible to a broad set of investors who are looking for consistent growth. After all, as Ostawal of Warburg Pincus explains, it was only after a clutch of housing companies—Aavas, Optus, Home First—got listed and showed a consistent record of performance that the sector attracted a flurry of investors from both India and overseas. It is possible that microfinance could also offer such an opportunity in the next few years.

'The only way you can survive 150 years is by discipline'

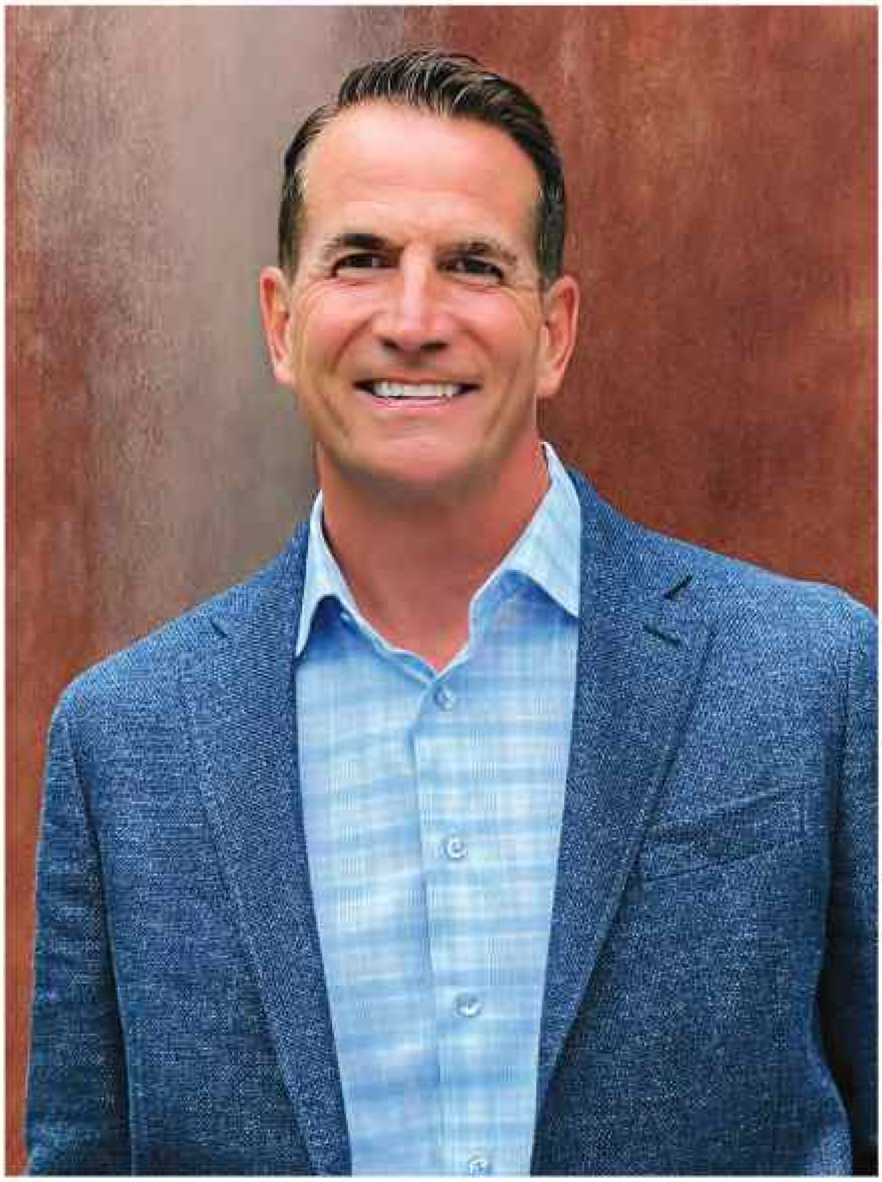
David Kohler, the chair and CEO of Kohler, talks about the company's India plans, and why there is an X factor when a member of the founding family runs the business

By JASODHARA BANERJEE

Kohler, a global leader in the kitchen and bath space, inaugurated its third experience centre in Bengaluru last week. David Kohler, chair and CEO, also the fourth-generation family member leading the US-based company, talks to *Forbes India* about what it took for the company to survive 19 recessions, two wars and two pandemics and maintain its position as a global luxury brand in various markets.

Q Kohler is completing 150 years. What does it feel like to be a part, and a member of the founding family, of a company that's 150 years old?

It's a tremendous honour and I'm very proud and humbled to serve in the capacity I do as chair and CEO of a 150-year-old private company that has been held by the same family for that period of time. It's an amazing company, I think, in the quality of the people, the quality of the purpose, the mission, and the social impact we've had over the years. So, there's a lot of pride, and a lot of responsibility to all the stakeholders that we impact all around the world, from shareholders to all our 40,000 associates, to all the communities we operate in around the world. We touch a lot of families, and so it's a great responsibility.



Q Apart from being a member of the founding family, you have also worked in several verticals within the company. What would you say are the principles or the ethos that hold everything together?
The only way you survive for 150 years, let alone thrive, is if there's a level of discipline and sticking to a set of values that have made you successful. So, I think our story is one of perseverance and discipline guided by our mission, which is to enhance the level of gracious living for all those people touched by our products and services.

Our first and foremost guiding principle is to live on the leading edge of design and technology in product and process. So, driving innovation is the heart and soul of our competitive advantage in what we do. The second principle is to always produce to a single standard of quality, regardless of price, across our business. Third is around quick, consistent delivery. And fourth is maintaining an organisation of passionate associates that truly take ownership and pride in what they do. And our final guiding principle is to reinvest over 90 percent of our earnings back into the business.

So, I think it's this combination of left brain-right brain thinking: Disciplined, analytical, conservative financially, but at the same time being entrepreneurial and inventive, which allows you to continue to innovate with the changing markets and environment.

Q You mention changing markets and environments. Today we're talking about a lot of stagnating, slowing economies across the world. What are the fundamental lessons that, as a company, you can take away from hard times?
Through our history, we've been through 19 recessions in the US, two pandemics, World Wars, crises of plants burning down, and all sorts of things. And I think the lesson we always take away is a discipline and a commitment to the long-term as a business and a tenacity to be able to weather cycles and challenges by controlling what we can control. We can control our attitude, we can control our energy and our effort, we can control our financial discipline.

The Bengaluru KEC, the third in India, provides an immersive experience to customers

So, historically, there's always been economic cycles in our business and challenges, particularly being in a housing-related business. We've always had to have a conservative balance sheet position and never get over-leveraged or over-extended because you can't make it through cycles if you exist like that. It's this combination of financial discipline and operating discipline combined with a tenacity and a perseverance and a confidence that we can really control our destiny and work through any challenge that we face as a company.

Q The third Kohler Experience Centre [KEC] has just been inaugurated in India, in Bengaluru. What plans does the company have for India, as a market and as a manufacturing base?
Well, it's an exciting time because India is the only country in the world where we now have three KECs, and we plan to add more KECs in India over the next few years. They're critical to bringing our products to life for consumers and creating an immersive experience. India is one of our top three markets, and one of the most important markets in the world strategically. This is because of the growth rates that we see in India. It's the fastest-growing large economy in the world; 6 percent-plus GDP forecast going forward. Incredible demographic growth in terms of per capita GDP and the wealth creation of the middle class and affluent class and luxury class.

It's an incredible market opportunity for our brand and business, and we've been growing at twice the market rate over the last five years. We also think that Indian design and fashion sensibilities, and the pride people have in their homes—this has only been accelerated post-Covid—is an incredible growth opportunity in terms of expanding the market size over a period of time.

India has been an excellent area for us to manufacture in, and it's been central to our success in the country. We couldn't be where we are today in India if we didn't manufacture in India, because we otherwise couldn't provide the array of products, or the consumer value for those products, or the service levels that we do. We have two manufacturing facilities for our kitchen and bath business in Gujarat. We also have a diesel engine manufacturing facility in Aurangabad in Maharashtra, and we're building an electric vehicle control facility in Pune.

Our manufacturing plants here allow us to deliver an array of products designed and developed for India, which is one of the factors that has made us successful. We don't just take global product lines and bring them into India. We study what the Indian consumer likes and wants. We've developed special colours and products uniquely designed for the Indian market and consumer.

Q Is this the same approach that you follow in other countries and markets as well?

It is. It's been central to our success in China and the United States and in different markets. And it's something we started really early on in India, that is designing and developing based on insights from the Indian consumer.

Q What are the plans for India where investments are concerned?

We have ambitious plans. We'll be expanding showrooms across India. This year our plan is for about 160 new showrooms in India, plus the KEC. There'll be more KECs and hundreds of showrooms every year. On the manufacturing side, we're investing in all our areas and expanding all our lines of business with millions of dollars of investment over the next few years.

Q Although India is not your top-most market, it now has the highest number of KECs. Do these play a significant role in the B2B or B2C segment? What kind of customers do you aim to attract through them?

KECs play well in both B2C and B2B segments. If you look at the KECs, they're an incredible showcase of the largest assortment of our products you can find anywhere in the country. And it really opens up consumers' minds as to what's possible, because many of them only see fragments of a product line. And then [at a KEC] they're able to see what's possible and work with professionals who can help them understand the product line and how they could specify a whole product assortment for their homes. And the same is true for architects and designers. We have professionals who can work with people from architectural studios and design studios to understand what products might be best to specify in different types of projects.

Q What percentage of the bath and kitchen vertical products that are manufactured in India cater to the domestic market and what percentage is for export?

Today it's 80 percent for the domestic market. And that's really a function of the growth of our domestic business, which has been so strong. We've needed the available capacity for the domestic market.

Q What have been the factors behind this growth over the last few years?

Certainly in the last decade there's been some government policies and moves that have helped improve the economic foundation of the country. Also, the infrastructure investments in the country have helped improve the economy. And I always also say that demographics, at the end of the day, drive pretty much everything. When you have such a young population growing in affluence and the desire to purchase goods and homes—I think 27 percent of homebuyers now in India are under 35 years old—all these things contribute to a rapidly growing economy where people are increasing their income and want to improve the quality of life.

> **"Our manufacturing plants here allow us to deliver an array of products specially designed and developed for India."**

Q How do you keep the family as part of the business? Do you see future generations of your family being equally invested in the company or do you have plans of succession planning in other ways?

First and foremost, we think about our business as a privately held company. Now, it is family controlled, but it's a private company. And my goal, our goal, is to build a company that's so strong, that it doesn't matter whether one of us or multiple of us are taken out of the company, the company can continue to thrive and grow because of proper succession of leadership. We also believe it's not imperative that a Kohler family member lead the company.

But we also want to foster in our family, a pride of stewardship and ownership of the company. So that's something we do very much with our generation, the fourth generation, and then the fifth generation, where there are 10 in the next generation. We're teaching them about the company and engaging them so that they can be proud and responsible stewards for the company, whether they just serve as a shareholder, or whether some of them decide to work in the company.

We certainly think a number of the next generation will work in the company. But to rise up to senior levels over time, they're going to have to demonstrate their competence, their passion, their commitment, as a part of meritocracy, to deserve the right because, at the end of the day, we need to make sure that the leaders operating the company are the most qualified people, whether they're family members or not. So, we have to maintain objectivity, but it is great to have family members that are passionate and competent, because they bring an X factor, if you will, to the equation by being part of the family that is stewarding the company. So, we are hopeful we'll have a number of the next generation who want to play significant roles in the company over time.

CURIOUS MINDS

Harnessing the power of tech and data, CTOs and CIOs are fostering innovation and improving efficiency at their workplaces

An Eye For Emerging Tech

Abhijit Mazumder

CIO, TCS

Abhijit Mazumder has various accolades and patents to his credit. He joined TCS as a consultant and has been with the company for 28 years.

While growing up, the allure of science fiction captivated Mazumder, fuelling his imagination and curiosity about the potential of technology and how it could shape and influence society. This encouraged him to pursue a career in technology.

Mazumder—who admires TCS Chairman N Chandrasekaran—believes as CIO, it is his responsibility to ensure the company remains agile and prepared for future needs with a focus on building trust among customers and fostering a positive work environment. He emphasises the need to align technology strategies with evolving business needs for the organisation's growth and success.

He has two patents (jurisdiction India) to his credit—one granted for an invention that provides a system for mining results more efficiently while the other for an invention that provides a system to enable a secured collaborative pricing framework for IT & ITeS outsourcing deals.

Mazumdar acknowledges the transformative impact of emerging technologies like 5G and artificial intelligence which present new opportunities to solve problems and drive change. A fine technology-driven initiative managed by Mazumdar is the digitisation of the period-end accounting processes and financial book closures, Business 4.0 practices, and Machine First Delivery model, which have led to the early publishing of results. Leveraging technologies such as in-memory computing, real-time reporting and visual analytics tools have significantly reduced the time required for financial closure.

The company, says Mazumdar, has a well-defined and clearly articulated IT strategy that prioritises best-in-class experiences and efficient processes. Regular evaluation of emerging technologies, guided by a Tech-Radar, enables them to explore, adapt, sustain and retire technologies effectively. They ensure that their technology teams are equipped with the necessary skills in the face of emerging technologies.

A Continuous Learner

Neeraj Chauhan

CIO, PayU India

An award-winning people-centric transformational leader, Neeraj Chauhan is respected for gamechanging contributions and his passion for talent development and customer satisfaction.

Since his early years, Chauhan, who is CIO of PayU India, a global payments platform, was fascinated with the potential of technology to transform the world around us. He was driven by the opportunity to create a meaningful impact and contribute to the digital transformation of businesses and society at large. This passion led him to pursue a degree in computer science which laid the foundation of his career in technology.

As CIO, Chauhan aims to deliver business value through technology and leverage his expertise to achieve objectives. He participates in strategic discussions and engages in cross-functional collaborations to gain insights into key priorities that help him shape the technology roadmap and initiatives. He has developed frameworks for risk mitigation, enhancing data privacy capabilities, and accommodating evolving consumer needs while maintaining strong security measures.

"Fostering innovation and cultivating a culture of continuous learning and improvement are integral to the success of technology-driven organisations like PayU," says Chauhan, who has a working experience of 19 years. He encourages his team to innovate, experiment and learn by providing opportunities for cross-functional collaboration, hackathons, and challenges to spark creativity and out-of-the-box thinking.

Chauhan has been instrumental in managing various technology-driven initiatives. Under his guidance, his team spearheaded the adoption of cloud technology in PayU, swiftly migrating from legacy systems to a modern, reliable and scalable cloud architecture in under two quarters. He has led the implementation of Tmura cloud threat intelligence system, providing monitoring, alerting and governance for cloud operations, enhancing security and compliance, and the cloud finops framework, including the Cloud Cost Explorer, to analyse and optimise application costs across multiple cloud accounts.

To be successful, Chauhan believes, one needs to embrace continuous learning, and foster a collaborative and inclusive culture. "Success is achieved by leveraging the collective intelligence and diverse expertise of our teams," he says.

Driven By Data

Maheshwaran Calavai

Chief digital & AI officer, TVS Motor

With over 25 years of experience, Maheshwaran Calavai has been instrumental in harnessing the power of data and emerging technologies to enhance operational efficiency and develop innovation in his organisation.

Calavai is chief digital & AI officer at TVS Motor, and his interest in technology stems from his curiosity about how it can propel businesses forward. He recognised the exponential growth and impact of technology on businesses, and has dedicated his career to understanding and utilising its potential.

At TVS Motor, he oversees various initiatives ranging from consumer engagement platforms and extended enterprise systems to industrial IoT [Internet of Things] and new product development. By working at the intersection of digital and AI [artificial intelligence], Calavai's team brings new experiences and transformations to the forefront.

With TQM [Total Quality Management] orientation in the company's DNA, he leverages predictive and prescriptive algorithms in its AI systems. These algorithms enable production-scale analytics and help improve decisions for growth. By harnessing real-time data, the company makes rapid and robust decisions that drive operational efficiency and business success.

Calavai fosters innovation by looking at business drivers and KPIs that matter, and focusing energies on driving improvements to these through design of experiments, agile culture and outside-in open innovations. Effective communication is promoted through a combination of formal strategy discussions and all-hands meetings, as well as continual informal discussions such as sprint reviews and water cooler conversations.

One of Calavai's notable technology-driven initiatives involved modernising customer-facing systems to be modular and cloud-first. This transformation strengthened the organisation's data maturity and engineering capabilities, enabling rapid and informed decision-making based on real-time data, resulting in both business growth and operational efficiency.

Calavai's success mantra is to understand and focus on the business levers that matter most. He believes in staying curious about technological advancements and their potential to reshape these levers.

Shaping The Tech Trajectory

Murali Brahmadesam

CTO, Razorpay

Murali Brahmadesam holds a master's in computer science from the University of Florida, has made significant contributions to the technology industry and received numerous accolades in his 20-year career.

As founding member of the Aurora database service, he was awarded the prestigious SIGMOD systems award in 2019 for his groundbreaking work in redesigning relational database storage for cloud environments. He was also awarded the Certificate of Merit by the University of Florida in 2001 and 2002. Additionally, he was an honorary member of the Tau Beta Pi association, a national engineering honour society.

He holds several patents, including Scalable Lookup Service for Distributed Databases, Backup and Restore Techniques using Bounded Checkpoint and Log Buffers, and Adaptive Database Replication for Database Copies.

As chief technology officer at Razorpay, Brahmadesam is responsible for shaping the company's technological trajectory and overseeing day-to-day operations. He aims to establish an exceptional engineering team that drives innovation and positions Razorpay as a global leader in the payments industry.

By leveraging the OKR [Objectives and Key Results] methodology, organising hackathons, and encouraging open-source contributions, he ensures that his technology team remains at the forefront of industry trends and advancements. Through monthly planning meetings and leadership gatherings, he ensures that everyone is aligned with the company's objectives.

He has established a GRC (Governance, Risk, and Compliance) framework, providing regular employee training sessions on security awareness and ensuring the safety and integrity of the organisation's technology infrastructure and sensitive data.

Brahmadesam believes in the democratisation of artificial intelligence (AI). In evaluating emerging technologies like generative AI, machine learning and blockchain, he takes a customer-centric approach and aligns technology initiatives with customer requirements.

With renowned software engineer David Cutler as inspiration, Brahamdesam is driving Razorpay's growth, making significant strides in the fintech industry, and empowering his team to achieve their full potential.

A Fighter's Vision

Sanjeev Barnwal

Co-founder & CTO, Meesho

Sanjeev Barnwal is co-founder and chief technology officer (CTO) of Meesho, an ecommerce platform catering to fashion that was launched in 2015. An admirer of Sam Altman, Barnwal believes: "To attain success, unwavering commitment to a problem, adopting a fighter's attitude while building the right team and culture are of paramount importance."

He realised early in life that technology holds tremendous potential to create a massive impact in this world. Raised in a modest household in Jharkhand, he was drawn towards engineering due to its emphasis on innovation and creativity; he completed his BTech from IIT-Delhi.

As CTO, Barnwal says his primary responsibility is steering the company's technology vision and leveraging cutting-edge technology to generate the highest possible value for the customers. He believes in staying abreast with the latest advancements and innovations, such as generative AI (artificial intelligence) that have the potential to transform the ecommerce experience.

Barnwal states that CTI [company>team>individual] serves as a fundamental principle at Meesho, guiding employees to collaborate more efficiently and work towards shared objectives. He acknowledges that fostering true innovation requires empowering individuals with a sense of ownership, clearly defined objectives, and a culture that encourages freedom to experiment and innovate. "Bold experimentation stands as one of our core values and guiding principles," he says.

At Meesho, they have a dedicated team of data scientists and machine learning engineers who focus on challenging problems—such as developing robust recommendation engines. As a leading ecommerce company, they have effectively spearheaded a focus on personalisation, using data science to customise each user's experience, resulting in a substantial surge in order conversions, with improvements going as high as up to 50 percent, they claim.

"Through careful evaluation and prioritisation, we continue to embrace technologies that offer significant potential and align closely with our goals while acknowledging the current limitations of others in meeting our unique requirements," says Barnwal.

Empty Nest

A startup raises around $110 million from marquee backers, gets valued at close to $220 million, and then eventually gets sold at $11 million. Why did the funding birds abandon NestAway?

By RAJIV SINGH

With absence of backers, and a diminishing runway, NestAway just had one option: To look for buyers

SHUTTERSTOCK

March 2018, Bengaluru

Four young birds of the same feather were busy building their dream nest. Started in 2015 by Amarendra Sahu, Deepak Dhar, Jitendra Jagadev and Smruti Parida, NestAway had a flying start. From an operating revenue of ₹5.76 crore in fiscal year 2016, the home rental startup leapfrogged to ₹36.51 crore in FY17. Observers and industry analysts called it beginner's luck.

They were not too off the mark. The next year, the Tiger Global-backed startup had a sedate growth, with a top line of ₹46.98 crore in FY18.

With a sizeable presence in Bengaluru, Delhi NCR, Hyderabad, Mumbai and Pune—the startup catered to over 35,000 tenants and 16,000 owners—NestAway's math was making sense.

No wonder, marquee investors flocked in droves. In March 2018, NestAway raised $51 million from Goldman Sachs and UC-RNT Fund, a joint venture between Ratan Tata's RNT Associates and the University of California. The Series D round of funding also saw participation from existing backers such as IDG India and Tiger Global. The shared rental platform now planned to spread its wings and enter new categories such as community and student housing. The nest was getting crowded, and the founders were fast mastering the bricks and mortar of the business, which had a massive upside.

Though NestAway's growth was brisk, the writing was on the wall. Ballooning losses were hard to be missed: From ₹37.2 crore in FY16, they more than doubled to ₹97.73 crore the next fiscal, and then jumped to ₹156.81 crore in FY18. A year later, the bottom line was deep in red, to the tune of ₹219.68 crore.

"All of us were busy chasing growth," reckons a former senior NestAway executive on the condition of anonymity, who has been with the company since 2015 and exited last year. The piling up losses should have made the co-founders and stakeholders press the panic button. "It didn't happen. We wanted to grow, and cutting expenses was not the right strategy," he says, adding that the startup hit a valuation of $220 million in 2019. "Everybody had losses. We were not exceptional," he adds.

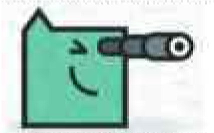
But there was something not quite right about NestAway. One of the backers, on the condition of anonymity, points out that 2019 was the year when the fault lines in NestAway got exposed. In July, Deepak Dhar—one of the four co-founders who had a 10 percent stake—quit. Three months later, Smruti Parida, another co-founder with a similar stake, exited. If investors sell their stake in secondary transactions, points out the venture capitalist, then there is something to think about. "But when co-founders exit in such a short span of time, it's a sign of something terrible," he adds. Early in 2019, another co-founder, Jitendra Jagadev, stepped out of NestAway and started taking care of its subsidiary HelloWorld.

While the official reasons for co-founder exits are always sugar-coated, the unofficial reasons are the familiar ones. In NestAway's case, while there was no co-founders' conflict and the exits were amicable, the trigger was absence of consensus regarding the role and way senior management was hired and allowed to function.

Name & Game

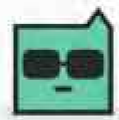
NestAway was founded by **Amarendra Sahu, Deepak Dhar, Jitendra Jagadev, Smruti Parida** in 2015

Bengaluru-based co-living and home rental startup is **a technology platform facilitating rental transactions and a bunch of related services**



It streamlines property search, scheduling visits, rent payments and service requests

NestAway reportedly has 18,000 properties on its platform, and a website traffic of 600,000 visits



Was backed by **Tiger Global, Chiratae Venture, Goldman Sachs, Kalyan Krishnamurthy, RNT Associates** (Ratan Tata's investment arm), **University of California**

Distress sale

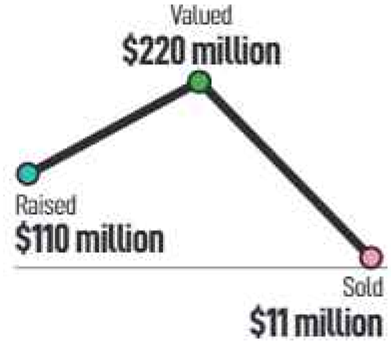
95%

Valuation haircut taken by NestAway

Last month, Aurum PropTech bought it for **$11 million** (Rs 90 crore)

In June 2022, Aurum acquired HelloWorld, a subsidiary of NestAway providing co-living spaces to students

NestAway in numbers



"Co-living and renting apartments are here to stay for a long time. We will make NestAway stand and run again."

ASHISH DEORA
FOUNDER, AURUM PROPTECH

An obsession to get 'experienced' hands from 'big' names led to a bloated employee benefit cost sheet, which turned out to be the biggest item on the expense book for years.

In FY18, the employee cost stood at ₹93.49 crore, a 2.1X leap from the previous fiscal. "Many of the senior management were drawing salaries of over a crore," says another former executive at NestAway. "Even during the pandemic, most of them didn't have a salary cut," he contends. While the employee cost dipped in FY19, the numbers again increased in FY21 and FY22. (see box) "Don't you find this weird," he asks. In fact in FY22, the revenue from operations (₹57.87 crore) was lower than employee cost of ₹69.46 crore.

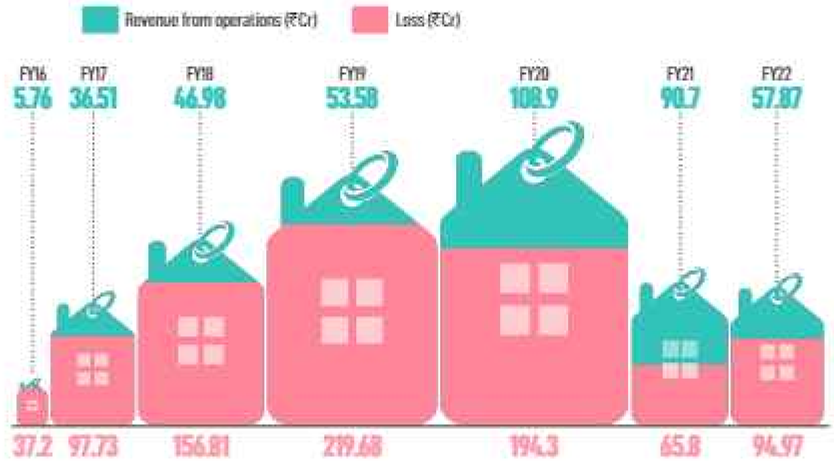
There was another problem for NestAway, and this had nothing to do with the way company was run. The pandemic dealt a cruel blow, and aggravated the woes of the startup. Revenue dipped, operations were shrunk to tame the losses, and it was hard to find new backers. The existing backers declined to pump in more money.

A VC with a home-grown fund explains why having big, marquee foreign names on the board means nothing during a crisis. "They never invest a substantial amount," says the VC, requesting not to be named. "If the bet pays off, they are happy, but if the tide turns, they prefer to write-off," he says.

With absence of backers, and a diminishing runway, NestAway just

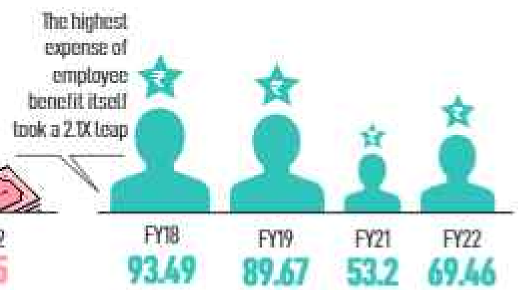
INFOGRAPHICS: MUKESH SINGH

NestAway's report card



Cash from operations
in ₹Cr (negative)

Employee benefit cost (₹Cr)



> **"At times, big names and big money have a tendency to make you complacent, and blur your focus."**
>
> **ANIL JOSHI**
> FOUNDER, UNICORN INDIA VENTURES

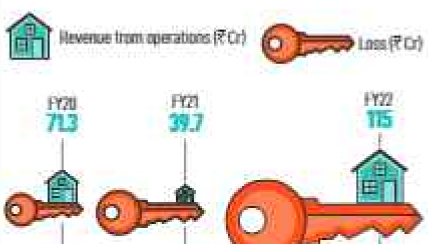
had one option: To look for buyers. The process started last August. And there were three in the fray. "Gruhas and Anarock were the first two to come up with offers," says one of the VCs of NestAway. "Aurum Proptech was the third suitor," he adds.

While the VCs were keen to strike a deal with Aurum given its track record—it had bought HelloWorld from NestAway for ₹42

How has the big rival fared?
Stanza Living

Total funding raised **₹1,672 crore**

Last valuation **$490 million**



Cash from operations in ₹Cr (negative)

crore in 2022—the management was inclined to go with the other suitors. "The deadlock remained for over nine months," says the VC. Finally early June, Aurum bought NestAway for ₹90 crore. A startup that raised around $110 million and was valued at $220 million finally got sold at a 95 percent haircut.

Industry analysts and observers are not surprised. "They had a brilliant start but somewhere down the line they lost their focus," reckons Anil Joshi, founder of Unicorn India Ventures.

Much like any other real estate segment, home rental and co-living are an operationally heavy, extensive and draining businesses. While being too slow can take you out of equation, being too fast can kill you. A startup that was present in just a handful of cities till February 2019 spreads itself hyper thin over the next twelve months. In one of the media interviews, co-founder Sahu reportedly said that NestAway nursed an ambition to be "India's answer to Airbnb."

"One has to be realistically ambitious," says Joshi, adding that the team at NestAway slipped on execution. "It's a cruel business where you have to keep optimising cost," he reckons. The business model, he underlines, made sense. "The segment had massive headroom for growth."

Ashish Deora, founder of Aurum Proptech, too reckons that NestAway was well placed in a booming segment, which just had to survive the pandemic. "The startup and the business both are promising," says Deora, the new owner of NestAway. Shared rental and co-living, he reckons, are the future. "All one needs is to run the business in a sustainable manner," he says. "We will turnaround NestAway," he claims. Well, the task won't be easy, and till that happen, the empty nest of NestAway will keep haunting all founders who aspire to fly high without getting the basics right.

A Sugar-Coated FMCG Gambit

From chocolates and confectionary to dairy products and its hotel business, the DS Group has been diversifying over the last few decades. But can the maker of Rajnigandha pan masala beef up its non-tobacco play in terms of revenue?

By RAJIV SINGH

"DS Group has been increasing its presence in the confectionary market. With LuvIt, we now enter the chocolate segment."

RAJIV KUMAR
VICE CHAIRMAN, DS GROUP

April, Bengaluru

There were eight contenders in the fray. And with most of them having a hefty background in hospitality, it was supposed to be a close call. The winner, though, was a Noida-based company, which reportedly paid ₹300 crore and bought Viceroy Bangalore Hotels, which owns the Marriott-managed five-star Renaissance Bengaluru Race Course Hotel, and was in debt of ₹1,100 crore.

Back in December 2022, the Radisson Hotel Group inked a deal with an FMCG company from Uttar Pradesh to bring two of the properties it owned—Namah Resort in Jim Corbett, and The Manu Maharani in Nainital—under its portfolio of brands. In 2014, the homegrown FMCG major had joined hands to open Radisson Blu Hotel in Guwahati.

Meanwhile, in 1987, a small family-owned business in North India—which traces its origin to 1929 when it set up a small perfumery shop in Chandni Chowk, Delhi—was making its debut into foods and beverages by rolling out the 'Catch' brand of salt and pepper sprinklers. The launch was followed by an introduction of a range of spices, pastes and grinders. Over a decade later, the same company started selling beverages—Catch Natural Spring, mixers, clear flavoured water, soft drinks and juice beverages.

Two-and-a-half decades later, an upstart dairy brand from the cowbelt was getting ready to take the fight to Goliaths, Amul and Mother Dairy, by rolling out a premium milk brand Ksheer. The challenger brand had also lined up aggressive plans to launch flavoured milk and dairy whitener over the next few months. Two years later, in 2015, the same dairy company tried its luck in the hard-boiled candy (HBC) market with its brand Pulse.

Fast forward to February 2023. Läderach, a luxury Swiss chocolate brand founded in 1962, announced that it was joining hands with an Indian partner—which owned gourmet food retailer Le Marche—to launch the brand in India. Four months later, the Indian partner makes its biggest and boldest bet in

DSL, the crown jewel of DS Group

INFOGRAPHICS: MUKESH SINGH

the confectionery market by buying The Good Stuff company, makers of LuvIT chocolate and confectionery brand which is estimated to be over ₹90 crore. "We have been increasing our presence in the confectionary segment. With LuvIt, we will now enter the chocolate segment," says Rajiv Kumar, vice chairman of Dharampal Satyapal (DS) Group, which operates across the hospitality, confectionery, luxury retail, food and beverages, FMCG, pan masala and tobacco markets.

The DS Group is the same conglomerate which bought Viceroy Bangalore Hotels, stitched a partnership with Radisson Hotel, owns dairy brand Ksheer, has a presence in salt, spices and pepper sprinklers with Catch and Kewal, and is the biggest player in the hard-boiled candy market with Pulse. With the acquisition of LuvIt, the DS Group will have to take on big boys such as Cadbury and Dairy Milk to make a dent in the world of chocolates.

Kumar explains the audacious gambit. The Indian confectionary market, he underlines, is valued at approximately ₹23,000 crore, and chocolates make up almost 60 percent of it. The per capita consumption of chocolates in India is far lower than the global standards—140 grams per year in India as against 10 kg per year in the UK—and there is a huge opportunity in this segment. "We hope to make LuvIt a ₹500-crore brand over the next three to five years," he says, adding that LuvIt will benefit from the expansive distribution network of DS Group, which has over 3,000 dealers and seven lakh retailers across India.

SWEET INTENT, BITTER REALITY

Notwithstanding an aggressive diversification gambit by the DS Group over the last few decades, and Kumar's intent to accelerate the pace of confectionery play, the conglomerate is confronted with a bitter reality. To understand it, we need to have a close look at the way the DS Group, which has an estimated ₹5,500 crore in revenue, is structured.

Dharampal Satyapal Limited (DSL) happens to be the biggest entity within the DS Group. With operations in perfumery, pan masala, dairy and hospitality, DSL posted a revenue of ₹4,121 crore and an adjusted PAT (profit after tax) of ₹604 in FY22. While DSL contributes over 75 percent to the group's revenue, it gets over 70 percent of its sales from pan masala brand Rajnigandha, according to a recent rating report by Crisil.

The credit rating agency explains what has worked for the group. First is its leading market position in the premium pan masala market. In the tobacco and pan masala business for over 80 years—the group rolled out India's first branded chewing tobacco brand BABA in 1963—the flagship brand Rajnigandha commands 65 to 70 percent market share. In fact, the group has recently rolled out Mastaba, a mass market pan masala brand.

The second big plus for the group has been its retail footprint. Its network consists of 3,000 dealers and seven lakh retailers across the country. And it is this funnel which the DS Group has been using to push a range of its confectionery brands such as Pulse, Catch, Pass Pass and Chingles.

The second big component of the DS Group is DS Spiceco. With operations in straight spices, blended spices and table sprinklers under the brands Catch, Kewal and Maharaja Choice, Spiceco has a dominant market position across a bunch of northern states such as Uttarakhand, Punjab and Himachal Pradesh. The revenue of Spiceco has seen a decent growth over the last two years—from ₹610 crore in FY21 to ₹736 crore in FY22. The third company in the DS Group pecking order is Dharampal Satyapal Foods Limited (DSFL), which focuses on confectionary products. The company sells mouth fresheners and HBC under brands such as Pass Pass, Pulse, Chingles, and Rajnigandha Silver Pearls brands.

Industry analysts and FMCG experts explain why DS Group's diversification drive into non-tobacco and non-pan masala FMCG is not likely to make a serious dent. "The fault lies in the structure," says Rajan Gahlot, assistant professor at the University of Delhi. As long as

DID YOU KNOW

DS Group has been in the tobacco and pan masala business

for over 80 years

Rajnigandha, the flagship brand of DSL, commands **65 to 70 percent market share**

The group has **3,000 dealers and 7 lakh retailers** across India

Rajnigandha contributes **over 75 percent** to DSL's revenue

The per capita consumption of chocolates in India is far lower than the global standards and there is a huge opportunity in that segment

Mouth fresheners, candies & chocolates

Dharampal Satyapal Foods Limited (DSFL) is part of the DS Group, **and focuses on confectionary products**

Sells mouth fresheners and hard-boiled confectionery (HBC) under brands such as **Pass Pass, Pulse, Chingles, and Rajnigandha Silver Pearls brands**

Pulse has 10 to 12% market share in the organised segment

DSFL has also added **chocolate brands to its portfolio**

Spicing it up

DS Spiceco sells straight spices, blended spices and table sprinklers under the brands **Catch, Kewal and Maharaja Choice**

Sales under the Catch brand, which has a 2 to 3 percent market share in the organised segment, **are estimated at ₹650 to ₹700 crore in FY22**

Has a dominant market position in northern states such as **Uttarakhand, Punjab and Himachal Pradesh**

Operating margin of the company is **estimated at 10.3 percent in FY22**

Plus & minus of DSL

What works...

Leading market position in premium pan masala

Strong **pan-India distribution**

Consistent **diversification**

High **operating margin**

Healthy financial risk profile

...and what doesn't

Exposure to **brand and product concentration risk**

Regulatory risk

New bets **will take time**

Sizeable investment in group companies and external firms

Plus & minus of DSFL

What works...

Healthy financial flexibility of the DS Group

Strong market position in the HBC segment

...and what doesn't

Modest scale of operations **in a highly fragmented market**

Exposure to **intense competition**

Plus & minus of DS Spiceco

What works...

Strong operational, financial and managerial support from the DS Group

Established brand **presence in North India**

...and what doesn't

Modest scale of operations

Exposure to **intense competition and volatility** in raw material prices

Rajnigandha aggressively continues to drive the growth and profits, there would be less incentive to make other verticals grow at a furious pace. Take, for instance, Catch. The brand was rolled out in 1987, and even after three-and-a-half decades, it is not among the top five in its category. "It has nothing to do with the quality, but everything to do with the way it has been handled," he reckons.

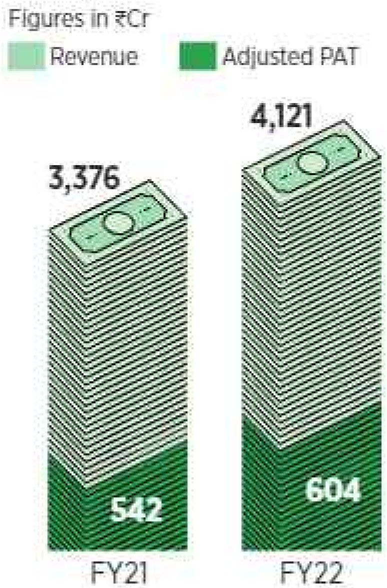
CATCH-22 & WHAT TO DO?

DS Group, Gahlot underlines, is not alone in facing a dilemma of chasing pan masala and tobacco versus pushing other FMCG verticals. Look at ITC. With a contribution of ₹31,267.46 crore, cigarettes still formed the biggest chunk of its revenue in FY23. It's not that ITC has been slow in pushing non-tobacco products and brands. The margins and nature of the product—cigarette—are such that it will take years for other siblings in the group to overtake the big brother. Add loads of regulatory uncertainties and risk in the pan masala and tobacco market, and you will get to see the cruel dilemma of players like DS. If they don't diversify, they are doomed. And if they diversify at a slow pace, they are equally doomed. "It's a Catch-22 situation for them," says Gahlot, pointing out another grim reality. All new ventures will take years to show results. "There would be no hockey-stick growth, and expecting a pan masala kind of growth would be unrealistic," he adds.

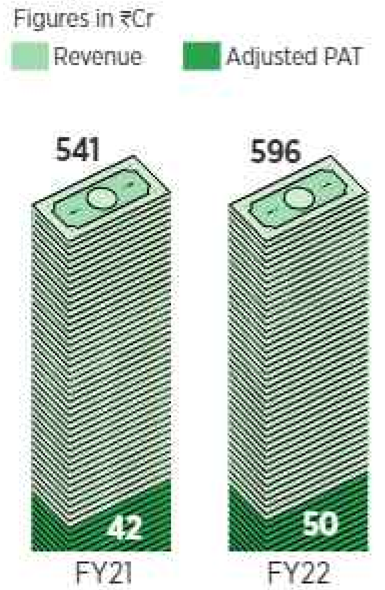
Another problem for the DS Group in its effort to morph into a serious FMCG player lies in the nature of non-pan masala and non-tobacco segments. Take, for instance, confectionery. There is a huge unorganised, unbranded market across the country, and in the branded play, DS Group is pitted against biggies such as Perfetti Van Melle. In chocolates as well, there are monstrous rivals in Mondelez and Nestle. "It's not easy to take market share from the big boys who have lorded for years," says Gahlot.

If intense competition is an issue, then lack of brand-building is an equally serious roadblock hampering growth. The beverage, confectionery and other FMCG brands under the stable never got enough advertising and marketing push. "Where do you get to see dairy brand Ksheer?" asks Ashita Aggarwal, professor of marketing at

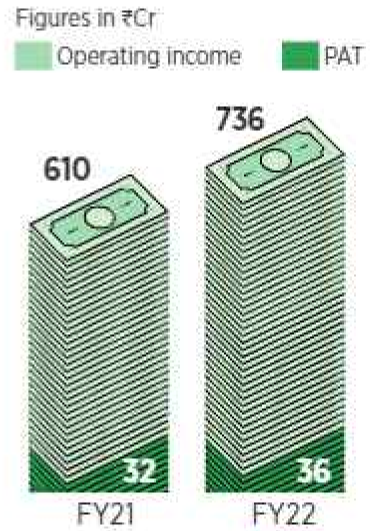
Report card of DSL



Report card Of DSFL



Report card of DS Spiceco



SOURCE Crisil

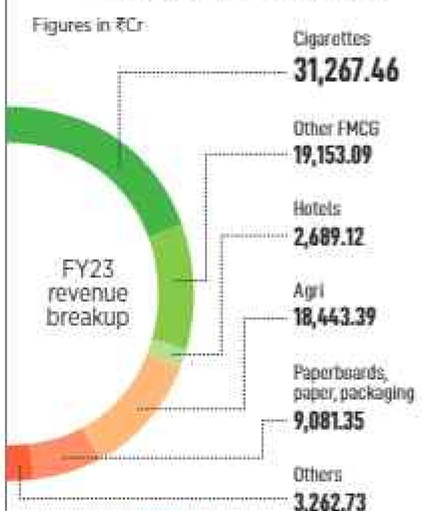
SP Jain Institute of Management and Research. The group, she reckons, has to start behaving like an FMCG company. The small-ticket items in the confectionery segment have to be fanned out across the country with ample advertising and marketing support. "It's a volume game, and it will take time. One should not be in the game only for the sake of being in it," she says. If the group seriously wants to de-risk itself from pan masala and tobacco, then it has to rejig its FMCG strategy.

The biggest issue, though, affecting the transformation is something that has made the group: Pan masala and tobacco. The lucrative nature of the business, the hesitancy on the part of the government to clamp down on tobacco and liquor products due to their high contribution to the tax kitty, and the inability to play the new game—read non-FMCG—with a high sense of urgency might haunt the legacy tobacco and liquor players, says an FMCG analyst with one of the top brokerage houses. You can definitely be an FMCG and cigarette or liquor conglomerate, but then you will be biased towards the categories which will give you the most and easy money, he says, requesting not to be named.

Kumar, for his part, underlines that the group is firmly on its track to beef up its FMCG play. "FMCG is the biggest business for the DS Group and contributes 80 percent to the turnover," he proudly claims. Kumar, though, declines to share the financials and give a break-up of what percent of FMCG revenue comes from pan masala and tobacco. But if Kumar has to seriously proclaim itself as an FMCG player, then the share of pan masala and tobacco has to progressively come down and non-FMCG play has to make a massive dent. Till then, just like the name of the salt brand, DS Group has to live with a Catch-22 situation.

ITC's biggest stick is cigarette

Cigarettes are still the biggest revenue churner for ITC, which has been diversifying into non-tobacco FMCG and other verticals over the last decade



SOURCE ITC filings, consolidated numbers

> "Cigarettes still form the biggest source of revenue for ITC."
>
> **RAJAN GAHLOT**
> ASSISTANT PROFESSOR, UNIVERSITY OF DELHI

Inside Bumble's Next Phase of Growth

With an increasing focus on global markets, Bumble Inc's flagship dating app is experimenting big time with artificial intelligence and machine learning

By NAINI THAKER

In Q12023, Bumble Inc reported a revenue of $242.9 million—16 percent higher compared to last year

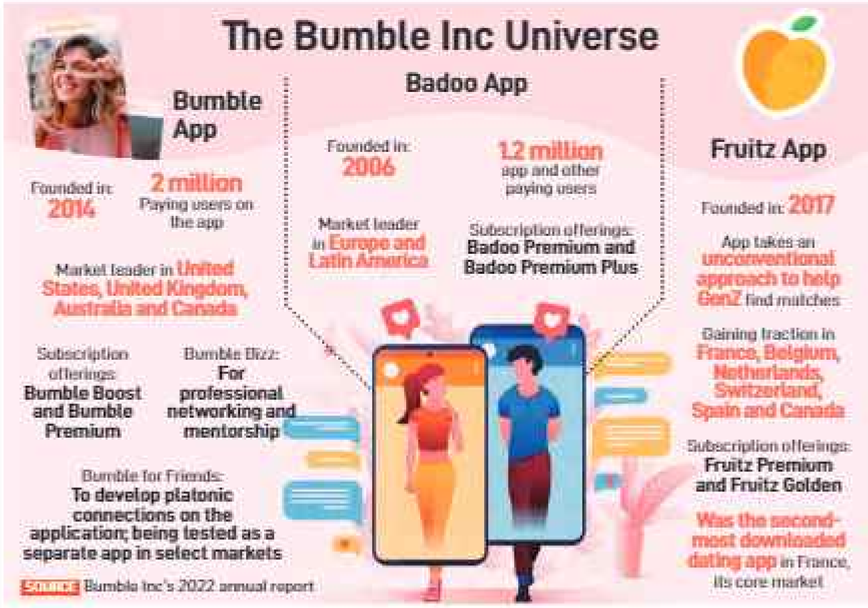
Early in my career, I was the target of online abuse and harassment. I lived in a perpetual state of anxiety; the internet felt like the Wild West, dangerous and toxic. I knew there had to be a better way: A kinder, more respectful internet," Whitney Wolfe Herd, founder and CEO of Bumble Inc, wrote in an exclusive blog for *Forbes India* in March. With that as the founding principle, Herd started Bumble in 2014, with a four-member team and a two-bedroom apartment.

From a mere dating application, Herd formed Bumble Inc, took it to a blockbuster initial public offering (IPO) in 2021 and is now expanding the business globally. With innovation, particularly with artificial intelligence (AI) and machine learning (ML) and new acquisitions, Bumble Inc continues to grow deeper, not just with its flagship dating app Bumble, but also sister applications, Badoo and Fruitz.

GROWTH LEVERS

For Q12023, Bumble Inc reported a revenue of $242.9 million, which was 16 percent higher compared to last year. The company's annual revenue increased from $761 million in FY21 to $904 million in FY22—a 19 percent jump, which was mostly led by revenue growth from the flagship dating app. Of the total revenue in Q12023, almost $194

SHUTTERSTOCK



million comes from the Bumble app.

The reason for the strong growth, both in terms of revenue and members? "Building experiences that really differentiate us and help us stand out from the market," explains Tariq Shaukat, president of Bumble Inc. Recently, he announced that he will step down in September and take on an advisory role at the organisation.

With all its applications, Bumble Inc is working to improve its products and marketing strategy. According to the company presentation for Q12023 results, the Bumble application has 2.3 million paying users. Bumble's women-first approach, along with its focus on safety, allows it to stand out among other competitors. According to Statista, Bumble is the second-most downloaded dating application globally.

The Badoo app—founded in 2006 and now part of Bumble Inc—is also a dating application with close to 1.2 million app and paying users, as on December 2022. It is a market leader in Europe and Latin America, as per the company's 2022 annual report. Andrey Andreev, founder of Badoo, was one of the main investors of Bumble. In 2019, he sold his entire stake in MagicLab (the company that owned both Bumble and Badoo) to Blackstone. Andreev then stepped away from the business, and Herd, Bumble's founder, became the CEO of the company, now known as Bumble Inc. In January 2022, Bumble Inc acquired Fruitz, a fast-growing dating app with a Gen-Z focus. It was the second-most downloaded dating application in France in 2022.

The US continues to be a large market, but Anuradha Subramanian, chief financial officer, Bumble Inc, says, "international growth is a big pillar of our growth strategy". Bumble has been seeing a lot of traction from Western Europe, Latin America and India is increasingly becoming a critical market. For every market, Bumble comes up with a unique marketing strategy, which is always in line with the local dynamics of that particular market. "It's not just about spending money to acquire customers for us, it is to build a brand organically from ground up in every market," she adds.

BUMBLE'S INDIA FOCUS

In 2019, India was one of the first international markets that Bumble expanded to, and the country has since been a key market. According to a recent report by data.ai Intelligence, India emerged as the fifth-fastest-growing market in terms of year-over-year growth in dating app spending in 2022. Indians spent $31 million more on dating apps in 2022 than they did in 2021.

Like with every other market globally, Bumble focussed on having a hyperlocal approach with India. The application supports over 30 languages in India. The platform offers language badges for people to showcase their language preferences and communicate more easily with their potential matches.

In order to further ensure safety for women, says Shaukat, "we introduced a feature where a woman can use only the first initial of her name to create her Bumble Date profile. Whenever she is ready and comfortable to share her full name with connections, she can; but until then, her identity is protected". This feature is only available for the Indian market.

In India, Bumble operates on a freemium model, with the availability of different subscription packages like Bumble Boost—base tier subscription—at ₹149 per week and Bumble Premium starting at

"We define ourselves as a product and engineering-led company. We know that bad products can't market their way to being great products."

TARIQ SHAUKAT, PRESIDENT, BUMBLE INC

₹449 for a week, for which you get access to certain enhanced features. Subramanian says, "We have a pricing team that looks at pricing in every market at a nuanced level." When entering a new market, Bumble gives people the option to test out some of the paid features—such as Spotlight and SuperSwipe, by paying for them individually. "They can then upsell into a subscription product, if they need to," she adds.

As compared to many of its peers, Bumble claims to be earning a lot more in terms of subscription revenue. A driving force for this could be its pricing strategy. Though Bumble Biz and Bumble for Friends have a few paid-feature options, a majority of its revenue comes from Bumble Date.

INNOVATION-LED APPROACH

"We define ourselves as a product and engineering-led company. We know that bad products can't market their way to being great products," says Shaukat. The product team at Bumble has been working on ways to further integrate AI and ML. For years now, content moderation, personalisation and recommendations have all been powered by this technology.

In Western Europe and India, Bumble has recently launched a test product called "Best Bees", which gives a more curated list of potential matches via an AI-driven algorithm. Shaukat explains, "Instead of saying 'Here's all the people that you may want to connect with', with Best Bees, the AI tech gives you the top three people that Bumble thinks will be of high interest to you." Bumble has been seeing a double-digit increase in match rates coming from Best Bees.

Bumble will be using artificial intelligence to:

Build products like 'Best Bees'

Improve product experience for the user

Make software development faster and more efficient

Apart from introducing products like these, AI can also help improve existing user experience. For instance, selecting the best photo to upload for a user's profile or crafting a bio to maximise the user's chance in finding the most compatible match. The team is also working on ways to use AI to make software development faster and more efficient. Subramanian says, "We believe that if you build the best experience for the member, the growth automatically comes."

GLOBAL EXPANSION

Most recently, Bumble has acquired Official, an app that's meant to build stronger relationships for couples through mood check-ins and date planning. "Our philosophy is not to just buy a bunch of apps in our portfolio, we want to make sure we are much disciplined about what we are acquiring," reckons Subramanian.

Bumble for Friends came about organically, when the team found that a lot of people were on the application with bios stating: Here to find friends, not to date. "They were almost hacking the app in order to use it for a completely different use-case. That to us was a good signal that we should lean into this and start really building products like Bumble for Friends ," says Shaukat. Close to 15 percent of our users use Bumble for Friends. It is one area that the team at Bumble Inc is hoping to expand rapidly. "We feel like there isn't a product out there like Bumble for Friends, which brings people together. So, this is definitely an exciting opportunity," says Subramanian. The feature is particularly extremely common in India.

Similarly, Bumble Bizz helps people build a professional network and find jobs through this network. "With very little marketing, it is already getting a lot of organic traction. We are quite pleased with the high usage of the product," adds Shaukat. While both have some paid-features available, there is no big plan to monetise either of these in the near future.

The team is only just getting started with its global expansion. Moving forward, they hope to continue growing deeper in every market—be it newer cities or demographics. Shaukat claims that Bumble has a lot of resonance with women, and they view it more as a lifestyle brand, instead of a pure dating app.

"When we speak to our member base, they ask us things like when are you going to help us with fertility? Or with weddings?" he reckons. "That is also one of the key differences that we take pride in—we've built a brand that means something, particularly for women." Clearly, there is a lot more for the brand to explore.

"It's not just about spending money to acquire customers for us, it is to build a brand organically from ground up in every market."

ANURADHA SUBRAMANIAN,
CHIEF FINANCIAL OFFICER, BUMBLE INC

Meet Kota's JOMOsapiens

A growing pack of students is enjoying the 'joy of missing out' in the cut-throat coaching hub of India. Pressure, stress, tension and fear are alien words for them. Here's a glimpse into their carefree lives

By RAJIV SINGH

"Are you going to take my picture as well?" asks Amit Kumar as he stares at the camera. The lens is all set to capture the emotions on the young boy's face; he came to Kota a year ago. "Now this will definitely add stress to my life," says the engineering aspirant from Bihar and breaks into a laugh. A bunch of his friends cackle as well. The cheerful lad poses for the camera, but requests not to publish his images. There are too many Amit Kumars in Kota and Bihar, reckons the happy-go-lucky guy. "As long as you are not showing me, my father won't get to know," he grins. "*Nahin toh baap maar dega* [else father will kill me]," he chuckles.

It's a long day: A student going back to his hostel after finishing the last class of the day

KAPIL KASHYAP

It's a Tuesday afternoon in Kota, Rajasthan. Kumar has bunked his coaching class—he has been religiously doing so over the last 12 months—and is chilling out with his friends at Romantic Chai Wala, a tea outlet in a bustling lane of the city. "What's the point of going to classes?" asks the 17-year-old, who has completed a year in Kota, and is now in Class 12. "I know I can never make it to IIT. But I have to pretend that I am preparing for the exam." But why pretend? Doesn't he feel bad wasting time, years and money? "No," comes a quick and blunt reply. "I can't argue with my dad. Nobody can. He just gives orders, and all of us in the family have to follow them."

A bureaucrat from Patna, Kumar's father always nursed an engineering dream for his son. "I had always been an average student," confesses Kumar. "I never topped my class or school," he says, adding that he wanted to become a fashion designer. The dream was ruthlessly crushed. "IAS *ka beta darzi banega* [An IAS officer's son will become a tailor]?" was how Kumar's father mocked him. "Spend two years at Kota. I want to see you as an engineer," the father ordered his son, who assured him of giving it his best.

The assurance, and promise, brought peace and happiness. "He was happy," says Kumar. "And I am happy." But what after two years... once it becomes clear that his son couldn't clear his exams? Would it not have been better to tell him that he is not made for engineering? Kumar smiles. The problem with him, he underlines, is that he doesn't listen. "He would have made my life hell back home," says Kumar. "So, it's better to spend two years here," he grins. "And I am having the best time of my life." No stress. No guilt. No parents. Nothing. Students, Kumar points out, in Kota live under stress, fear, expectations and pressure. "Some even die. It's terrible," he says, adding that from the parents to their kids, everybody is living under FOMO (fear of missing out). "Have you ever tried living under JOMO [joy of missing out]?" he asks me. "You too came to Kota because as a reporter you didn't want to miss out on this part of the story. Right?" he continues. "You also have FOMO." Kumar's blunt assessment made me wonder how life can be without stress. "Join the JOMO club," he takes a dig at me.

There are thousands like Kumar who are happy members of the JOMO club. Aditi Sharma is one of them. "I am a victim of a strong-but-false perception," says the 16-year-old from Madhya Pradesh whose father is a dentist and mother a software engineer.

Parents with glowing professional and academic report cards want the mantle to be taken over by their children. "Why is Rahul Gandhi supposed to be a politician if his father or grandmother happened to be one?" she asks. "Why am I supposed to be a 'bright' student? Is it my fault that my parents were [bright] and I am not?"

The young girl continues. "I have always been told and made aware about peer pressure," she says. "But trust me, most of the parents are living under intense peer pressure," she laughs. Their lives, she lets on, revolve around their friend's son, friend's daughter, colleague's kids... their achievements. "I want to become a chef," says Sharma, who was forced to come to Kota and was initially overwhelmed to see lakhs in the rat race to make it to the IITs or medical colleges. She was shocked to discover that her roommate had suicidal tendencies. "That poor girl is not able to cope," she says. "She doesn't even learn from me," says Sharma, who is in her second year in Kota, has lived a carefree life so far, and will go back next year. Her biggest achievement and satisfaction, she adds, are keeping her smile intact. The best way to beat stress, she points out, is to kill stress. "There is life beyond Kota," she says. "At best, Kota is a comma."

It's refreshing to meet hordes of boys and girls who have shunned FOMO and embraced JOMO in a place that has become infamous for students succumbing to immense pressure. A counsellor at one of the top coaching institutes is impressed with this new perspective and attitude. "Most of the students coming to Kota," he points out, requesting anonymity, "don't have an aptitude for engineering or medical." But they are made to believe they can do it. And once they get into that cycle, the pressure from parents, peers and the fear of failure drag them down. These JOMO boys and girls, he underlines, might be the ones scoffed at by others. "But if you ask me, they are the real winners," he says. The ones who know their limitations, he underlines, are the ones who know their real strengths.

Ajit Kishore is among them. "My parents forced me to come to Kota, so they better foot my bills," he laughs. "Why should I feel guilty for something I am not responsible for?" Kishore is from Uttar Pradesh and his father is a sugarcane farmer. If you have a 'poor' farmer's image in mind, you are mistaken. "We have a processing factory," smiles Kishore. His father, he tells us, caught the Kota virus because his younger brother made it to IIT-Kanpur, and is now settled in the US. "My dad wasn't respected in his family because he couldn't study," says Kishore, whose grandfather showered more love on his IITian son. "My father," he adds, "wants to set things right. But this is not the way."

Meanwhile, Harsh Singh Rathore tells us the preferred spot of JOMO boys and girls. "They spend most of their time at the mall," says the manager of Cinemall. They can be seen in coaching uniforms. "In fact, at times I get anxious when I see them spend hours here," he says, adding that they are always chirpy.

Back at Romantic Chai Wala, Kumar says why he wants the JOMO tribe to grow. "I don't want to sound preachy, but stress never helps," he says. Everybody, he adds, will eventually achieve and do something in life. "Success just can't be academic or professional," he says. "If I am happy, I am successful."

KAPIL KASHYAP

Time to chill: Local ice cream always finds takers

"I have been told about peer pressure. But most of the parents are living under intense peer pressure."

ADITI SHARMA
STUDENT AT KOTA

The Flip Side of Credit Uptick

Surge in demand for unsecured loans signals improved consumption and spending, but experts say the risk of high defaults is not being seen

By SALIL PANCHAL AND SAMAR SRIVASTAVA

Unsecured loans for most big banks in India have been growing rapidly

NIHARIKA KULKARNI / REUTERS

There has been much good news in India's economic growth story recently: Better-than-expected GDP growth, early signs of a recovery in domestic consumption demand, and financial institutions that are aggressively lending. The last, however, is not necessarily great news for the traditionally cautious regulator Reserve Bank of India.

It has, both in informal discussions with banks, and formal publication (half-yearly) Financial Stability Report released in June this year, highlighted the rapid pace of growth of unsecured loans in India's retail loans segment over the past two years. Unsecured loans—largely personal loans, loans on credit cards and some forms of consumer durables and student education loans—do not have collateral and thus are considered riskier than secured loans (auto, home, loan against property). Add to that a still high interest rate regime and it raises risks to the lending system.

Unsecured loans for most big banks in India have been growing rapidly (see chart). Retail had a CAGR of 24.8 percent from March 2021 to March 2023, almost double the CAGR of 13.8 percent for gross advances during the same period. It formed around one-third of the total banking system's gross loans and advances.

In this same period, unsecured retail loans increased from 22.9 percent to 25.2 percent and secured loans declined from 77.1 percent to 74.8 percent, the RBI Financial Stability Report for June 2023 showed. Although the Gross NPA ratio of retail loans at the system level was low at 1.4 per cent in March 2023, the share of special mention accounts (SMA) was relatively high at 7.4 per cent for all scheduled commercial banks (see table) and it accounted for a tenth of the retail assets portfolio of PSBs.

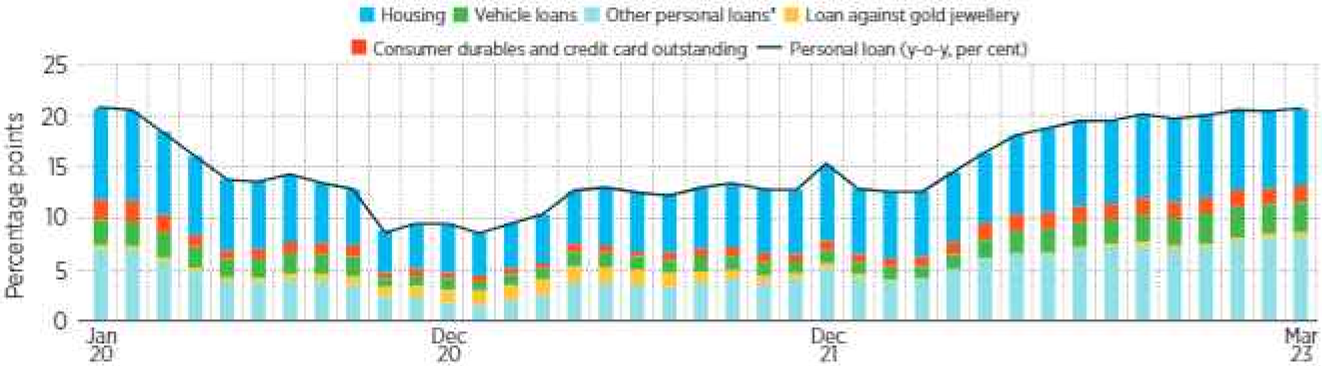
In the past year, credit card outstanding in terms of bank credit has risen near 26 percent to ₹1,94,282 crore as on March 24, 2023, compared to levels a year earlier. The credit towards personal loans has risen 22 percent to ₹11,00,404 crore in the same period.

A SIGN OF BUOYANCY

Experts say the uptick in unsecured personal loans is a sign of buoyancy. "People are willing to spend and buy more products and pay more for it...," says Akshay Mehrotra, CEO of digital fintech lender Fibe, formerly known as EarlySalary.

"The report does not say that it is a sign of concern, just that demand for unsecured loans is growing phenomenally. Unsecured loans are an indicator of consumption economy while secured loans are an indicator of asset economy (where people buy

Credit growth to retail sector - Contribution of different sub-sectors



Note: *Other personal loans include loans for education, domestic consumption, medical expenses, travel, marriage and other social ceremonies, loans for repayment of debt, etc.

SOURCE RBI

assets like homes or cars)," Mehrotra tells *Forbes India*. Fibe has an AUM of ₹2,400 crore, adding ₹150 crore each month. It had raised $110 million from investors TPG's Rise Fund and Norwest Venture Partners.

Even within the retail loans segment, the demand for personal loans and credit card loans is running better than other segments. On average, credit card loans are growing at 30 percent, double the pace of home loans. Personal loan growth is also growing at a higher tick than the overall retail loans portfolio (20 percent), analysts say. Both these segments also contribute towards improved margin growth for banks. Unsecured retail loans formed 7.9 per cent of the total banking system credit.

If the books for unsecured loans are growing too fast, players will naturally look for more opportunities and originators of these. "Fintechs have been busy players, becoming originators of unsecured lending—unsecured is a good way to acquire a customer and then sell them a secured product later," Mehrotra adds.

He said banks have been partnering more than ever before with fintechs; the number of co-lenders has doubled in the last year. Most of the leading banks such as SBI, Bank of Baroda and Axis Bank have in recent months tied up with non-banking financial companies (NBFCs) and fintechs to boost small-business loan activity.

For banks and NBCs, this has meant finding the route to provide loans faster, and at an affordable rate, to customers. Fibe did about ₹300 crore of business in the past year through co-lending with banks.

HIGHER PROVISIONS EXPECTED?

The RBI has always been concerned whenever demand for unsecured loans has outstripped overall retail or other segments. Because of past experiences, the central bank wants the unsecured loans segment to grow in a calibrated manner. "The RBI may call for higher provisions or higher risk weights on unsecured personal loans and credit cards, if the demand for these loans continues to rise," a source at a private bank said, declining to be named.

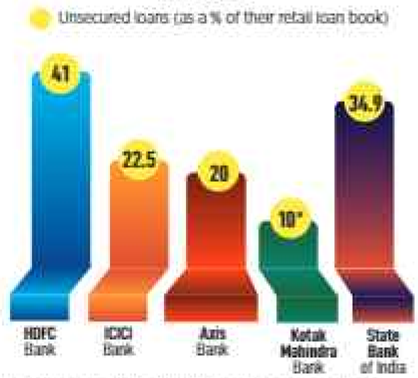
Some banks, such as HDFC Bank—where unsecured loans form 41 percent of the retail loan book—the provision coverage ratio for unsecured loans is at a high 96 percent.

Analyst Nitin Aggarwal, head of banking, insurance & financials research at Motilal Oswal Institutional Equities says: "The potential for increased risks to the ecosystem arising out of delinquencies in these two segments is not being seen at the moment."

The only marginal concern has come from SBI Card which has "identified a small segment of the legacy portfolio, which was showing higher delinquencies", its managing director and CEO Rama Mohan Rao Amara told media in May this year. The card issuer has told media that it will "reduce the kind of flow rates and also improve the write-off kind of performance".

The regulator might also start to have a closer look at the lending patterns of the buy-now-pay-later (BNPL) model, which really constitutes a type of personal loan. There is little data available on the delinquencies arising out of the BNPL model. Though the BNPL model is being rethought—after recent RBI regulations for non-banks on loading private payments instruments (PPI) through credit lines—the lack of transparency raises more concerns.

Banks' loan book: Exposure to unsecured loans



Note: Unsecured loans largely includes personal loans, loan against credit cards, consumer durable loans, and in some cases, education loans.

SOURCE Banks FY23 investor presentations

*This figure is as a % of the total loan book

HIS MAESTRO'S VOICE

He might be 87, but Mumbai-born conducting legend Zubin Mehta just wants to go on and on. His recent debut with Symphony Orchestra of India, the country's first and only professional orchestra, is just another example

By **KATHAKALI CHANDA**

ROBERTO SERRA - IGUANA PRESS / GETTY IMAGES

Zubin Mehta isn't a big fan of the changing face of Mumbai. "My city has changed a lot, and I don't like any of that," says the venerated conductor who grew up in Cuffe Parade in the 1940s.

But Mehta isn't bitter about it either. "What can you do?" says the 87-year-old who now lives in Los Angeles with his wife, former actor Nancy Kovack, in a villa that was once owned by Steve McQueen. "When I was here, there were two and a half million people, now there are 18 million. That's the way all cities change, and you can't just criticise."

There is one change to the cityscape, though, that Mehta quite digs—one that came through Khushroo Suntook, his friend of 80 years, as he points out, since they sat together as first standard students

Zubin Mehta conducts the Orchestra del Maggio Musicale Fiorentino in Bologna, Italy, in 2014

at Campion School in 1943. In 2006, Suntook, now the chairman of the National Centre of Performing Arts (NCPA), founded the Symphony Orchestra of India (SOI), the country's first and only professional orchestra. Mehta, who has led some of the world's most prestigious orchestras, including the Israel Philharmonic for 50 years till 2019, recently debuted with the SOI in its 17th year, marking a homecoming of sorts for the Bombay boy who left the city in 1954 to go to Vienna to study music.

The two sold-out concerts were performed at the NCPA in association with the Mehli Mehta Music Foundation (MMMF), a premier music education school named after his father, kicking off the Autumn 2023 season of the SOI that has been growing in stature over the years, touring internationally and also grooming a kids' orchestra.

"I can't say how pleased I am to conduct the SOI," says Mehta. "I didn't expect the quality that I have experienced. I hope I can come back very soon."

"My father was very proud that his name was used for the MMMF," an emotional Mehta says further. "I'm sorry my brother [Zarin] is not here. He is now in Chicago as a retired music administrator. I will phone him and tell him about what's happening here. He'd be very pleased to hear."

The SOI is sure to bring in a rush of nostalgia for Mehta, whose introduction to Western classical music came through his father Mehli Mehta, a self-taught violinist, who founded the Bombay Symphony Orchestra in 1935. "He grew up with performances and practices in the house, turning the pages for his father," says Suntook of his classmate. Mehta junior himself could play a bit of piano, but never considered a future as an instrumentalist as he was "too lazy to practise". "I preferred a game of cricket to a piano," he writes in his autobiography *The Score Of My Life*.

When he was 15, Mehta stood before an orchestra for the first time to "hold together" the Bombay Symphony Orchestra which was performing with violin virtuoso Yehudi Menuhin, touring India in 1951. "They were supposed to render Johannes Brahms's violin concerto... my father played the solo part," writes Mehta. "...the whole thing proved to be rather disappointing. I was severely reprimanded because I had apparently forgotten to give the third horn or the oboist his cue."

In three years, though, Mehta earned enough confidence from his parents, who let him opt out of a medical course and set sail for Vienna; that his cousin Dady was in the Austrian capital as a student of piano partly swung the decision in his favour.

Since then, medicine's loss has been a gigantic gain for music, as Mehta enriched Western classical with his interpretation of the masters, leading multiple top orchestras for years with acclaim. From 1961 to 1967, he remained the music director of the Montreal Symphony Orchestra, while assuming a similar title with Los Angeles Philharmonic

Orchestra between 1962 and 1978, and in the later years with the likes of the New York Philharmonic and the Bavarian State Orchestra, among others. In 1969, he began leading the Israel Philharmonic Orchestra, an association that lasted for half a century and of which he has now been named the music director emeritus.

In 1963, Mehta debuted as an opera conductor with Tosca, and has since conducted the marquee Metropolitan Opera and the Vienna State Opera, and at the Royal Opera House in the UK, among others. In 2022, a new concert hall of the Teatro del Maggio Musicale, an opera house in Italy's Florence, a city that has conferred him with honorary citizenship, was named after him. The Indian government, too, has honoured Mehta with the Padma Bhushan and the Padma Vibhushan.

Despite spending nearly seven decades abroad, his country of birth remains a leitmotif in Mehta's life. He still holds an Indian passport, drops by at his "ancient house" whenever in town, and keeps up with his childhood friends from the city, including the likes of Cipla Chairman Dr YK Hamied, who's three months younger to him and with whom he would meet every evening and on weekends to play cricket. During his recent visit, he shared a Parsi Bhonu with the SOI musicians on Navroze, the Parsi new Year that was celebrated on August 16.

Mehta has also returned to India often in his career, bringing global orchestras to his home audience at least a dozen times in association with the MMMF. In 1994, for instance, he brought the Israel Philharmonic, after full diplomatic ties were established between the two countries in 1992. "A bunch of us ladies," recalls Mehroo Jeejeebhoy, founder and trustee, MMMF, "with little experience of producing concerts, learnt how to use cranes and forklifts and put up a stage at the Brabourne Stadium without making holes in the cricket ground." The result was historic as the orchestra's five concerts in Delhi and Mumbai "broke a political taboo", reported the *New York Times*.

In fact, Mehta has always leveraged music to attempt to heal wounds caused by social and political divides. In one of his later concerts in India, he performed with the Bavarian State Orchestra in Kashmir, braving separatist threats. "It was my dream to conduct a concert in India with Hindus and Muslims sitting together," says Mehta. "Despite great opposition from certain separatists in Kashmir, the concert took place. Kashmiri musicians were threatened with death if they came. And all of them turned up. It's one of those concerts that I can never forget."

Not just Kashmir, but through music, Mehta has often spoken to a world riven by inequities. In January 1982, he performed at the border between Israel and Lebanon for Christians living in south Lebanon in the aftermath of the civil war; during the Gulf War in 1991, he flew into Tel Aviv and conducted free concerts in the morning (since evenings were blacked out to avert missiles from Iraq); in 1994, he performed at Sarajevo, the then Bosnian capital wrecked by bombing during the Bosnian War.

"In one of the first concerts of my life, with students from the Vienna Academy, we went over to the Austrian-Hungarian border during the Hungarian revolution in 1956 to play for refugees coming over from Hungary. At the end of that concert, a Hungarian priest came out in front and blessed us, in Hungarian probably because we didn't understand what he said," Mehta recalls. "But that blessing lasted a long time, which I appreciate very much."

One of his regrets remains his inability to perform in the Muslim-dominated areas of China. Ahead in the year, Mehta is touring China but won't be able to visit Urumqi, for instance, [the capital of the Uighur Autonomous Region of Xinjiang in northwestern China], to conduct. "They don't send me there despite my request," he says.

He glowingly refers to the West-Eastern Divan Orchestra co-founded by his friend and iconic pianist Daniel Barenboim and Palestinian-American academic Edward Said that is composed of Israel and Palestinian musicians, among others. Or one of his concerts for the Unesco in Paris where a Pakistani played Beethoven's Sonata with an Indian pianist, or an Armenian played with an Azerbaijani musician. "Israel doesn't have friendly relations with a lot of countries. Yet I have received standing ovations from the audience in those countries when I have gone with the Israeli Philharmonic," he says. "Don't underestimate the power of music."

Undoubtedly, it's music that powers on the maestro as well. At 87, he has his calendar blocked for the next several months—to Bucharest and Bangkok with the Florence Orchestra, then to Berlin and back to Florence. "In October, I'm going to do an opera and then will tour China," he says. "I am not stopping. It goes on and on." F

MEHTA'S MUSICAL JOURNEY: A SNAPSHOT

1936 Born in Mumbai

1954 Leaves for Vienna to study music

1959 Wins the Liverpool International Conducting Competition

1961 Becomes music director of Montreal Symphony Orchestra

1962 Begins 16-year stint as the director of Los Angeles Philharmonic

1963 Debuts as opera conductor with Tosca in Montreal

1967 Returns to India for the first time to conduct the touring Los Angeles Philharmonic

1969 Joins Israel Philharmonic Orchestra, his longest association of 50 years

1978 Took over as music director of New York Philharmonic for 13 years

1994 Brings Israel Philharmonic Orchestra to India after the two countries established diplomatic ties

2001 India confers the Padma Vibhushan; becomes the honorary conductor of the elite Vienna Philharmonic

2013 Performs in Kashmir with the Bavarian State Orchestra despite separatist threats

2023 Debuts with the SOI, India's first and only professional orchestra

INFOGRAPHIC: MUKESH SINGH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The World's Most Picturesque Cities At Night

From taking in the glittering billboards of Time Square in New York to admiring the cityscape from Marina Bay Sands in Singapore, here are some stunning destinations to explore at night

Exploring a city at night unveils a different dimension of its character, where vibrant energy and captivating ambience come to life. Travel specialists Travelbag used a comprehensive ranking methodology—light pollution, Instagram hashtags and night-time safety—to curate a list of cities that are the most scenic to explore after dark. Here are the top five cities promising unparalleled night-time enchantment:

1 Dubai, UAE

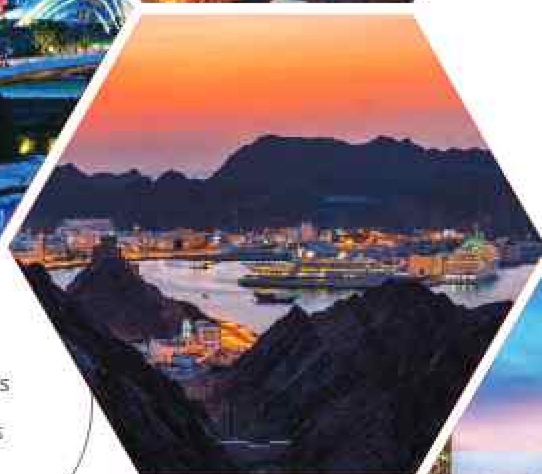
Dubai offers unparalleled beauty at night. The city's skyline offers a mesmerising spectacle. The view from the Burj Khalifa observation deck is an exceptional experience. Visitors can also venture into the Al Qudra desert, where the Dubai Astronomy Group hosts frequent stargazing gatherings.

2 Tokyo, Japan

Tokyo strikes a harmony between its luminescent urban landscape and the night sky. Visitors can immerse themselves in the brilliance of Shibuya Crossing's luminosity or the neon allure of Shinjuku. The nocturnal tapestry of Tokyo unveils a captivating odyssey that seamlessly blends contemporary architectural wonders with age-old customs. Tourists can delight in the culinary abundance of late-night food markets or Japanese tea houses.

3 Singapore

When night descends upon Singapore, its skyline undergoes a breathtaking metamorphosis. The illustrious Marina Bay Sands is one of the city's standout attractions with a rooftop SkyPark. Thanks to its iconic landmarks and bustling night markets, Singapore's nocturnal landscape pulsates with life.



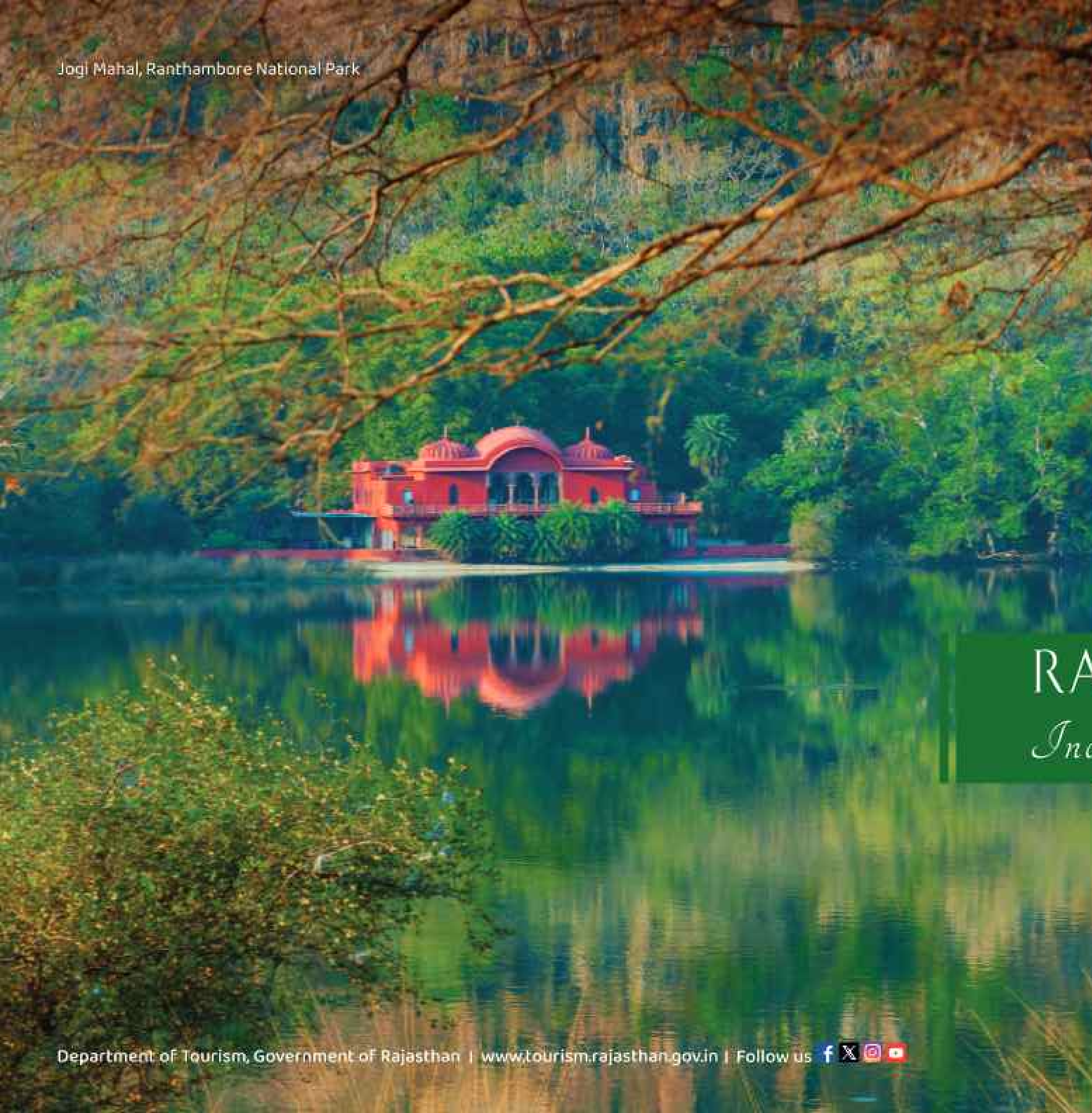
4 Muscat, Oman

Muscat is a beautiful city in Oman by the sea. It has a mix of old Arabian charm and modern style. This city offers a clear view of the sky at night and features impressive architectural landmarks to explore. Muscat's Mutrah Souq comes to life at night as the marketplaces provide visitors with a chance to discover many offerings, from colourful fabrics to spices.

5 New York City, USA

After dark, New York City's iconic skyline puts on a glorious light show. Visitors can check out the Empire State Building to see the whole city at night. Times Square is famous for its bustling atmosphere, towering digital billboards, and neon lights that create a surreal experience in the city. Embark on a boat ride on the Hudson River to see the Statue of Liberty lit up at night against the backdrop of the city's majestic skyline.

SHUTTERSTOCK



Ashok Gehlot
Chief Minister, Rajasthan

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