1-15 AUGUST, 2021

Down To Earth

FORTNIGHTLY ON POLITICS OF DEVELOPMENT, ENVIRONMENT AND HEALTH

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FIRST LINE OF DEFENCE OR LAST RESORT?

Used indiscriminately during the pandemic's second wave, life-saving steroids can have lethal side effects



LIVESTOCK

Importing Australian Merino sheep not enough to rescue India's fledgling wool economy

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Does India's population growth rate warrant coercive control measures?

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ONLINE TRAINING ON

UNDERSTANDING ENVIRONMENTAL LAWS FOR BETTER ENVIRONMENTAL MANAGEMENT

Course date: September 1-10, 2021 I **Last date to apply:** August 27, 2021

Course fees: INR 2500

India has a comprehensive system of regulations to protect its natural environment and the health of its people. From the enactment of Water Act in 1974, a number of laws and regulations have been put into force in this regard. However, the intended purposes of these laws are far from being fulfilled due to various reasons. One of the issues which sterns out is a holistic understanding of the different laws and how they should be looked into in a concerted manner for better environmental management.

Considering the need to fill the gaps, Centre for Science and Environment, is organizing a ten days online training course on "Understanding Environmental law for improving environmental management".

Learning from the Programme

- Better understanding of environmental governance structure of the country, major institution, and their implementation statistics.
- Increased understanding of the obligations of industry and individuals under various environmental laws and regulations and how to meet these obligations.
- Understanding the impacts of violations and noncompliance.
- Role of National Green Tribunal (NGT), environmental courts and public interest litigation (PIL).
- Understanding of international treaties and agreements Government of India subscribes to the impact of non-compliance with such agreements on business.
- Understanding that environmental compliance is not a financial burden but a clear business opportunity.

Course Objective

This ten days online course has been designed to capacitate the people working in the field of environment and the prospective environmentalist with an objective to develop a better understanding and knowledge of the laws and their interrelationship. This course will also be beneficial for students as wellwho aspire to develop their carrier in environment field.

The course will be conducted through technological learning tools such as presentations, videos, discussion with experts and reading material.

Who can apply?

- Industry professionals; Environment Consultants; Environment Engineers
- Researchers and academicians
- Students aspiring to work in environment field

Participants will be awarded with a **"Certificate of Completion"** on successful completion of the programme

Course Organizer

Ishita Garg,
Deputy Programme Manager, Industrial Air Pollution
Email: ishita.garg@cseindia.org

Make trade work for climate

SHOULD INDIA oppose the EU's plan for a carbon border tax—duty on imported goods like aluminum, steel, cement and electricity from countries with less stringent greenhouse gas standards? The answer is both yes and no. Let me explain the complexity, as global trade is critically linked to GHG emissions. EU's move is purported to pressurise other countries to impose similar taxation and thereby reduce emissions. But the question is if this plan—which reeks of protectionism in an increasingly inequitable world—will take us towards a more cooperative world required to combat climate change.

In the early 1990s when world leaders came together to discuss and then sign the Framework Convention on Climate Change they recognised ecological globalisation. It was understood that the emissions would add to the warming of the Planet and inevitably lead to catastrophic weather changes that knew no borders. It was understood that CO_2 is a long-lived gas—it lasts over centuries in the atmosphere. And therefore, what was emitted, say, in the 1880s—at the start of the industrial revolution—was still in the atmosphere and would "force" the temperatures to rise.

I am repeating this well-known fact to reiterate that ecological globalisation required countries to act together and to act differentially—equity was understood to be at the core of the climate change conundrum. It was not a moral question, but an imperative. If rich countries emitted in the past, poor countries for their development would emit in the future. But this was also the time when the world was busy signing free trade agreements—stitching the economies together so that global trade would be unfettered and flourish. The reason for this furious activity—expressly opposed by many in the developing world, including India—was that the already rich world was finding the cost of production too high in its world. It would be cheaper for its industries to set up shop in parts of the world, like in China, where labour was cheap, labour conditions were weak and environmental safeguards could be ignored. It worked. Reduced cost of production enabled consumption and economic growth in the rich countries.

In the three decades since then, the world has changed dramatically. Today, China is the biggest exporter; it has overtaken all other countries, including the US. With economic meltdown in several countries as a result of the pandemic, its share in global trade is only increasing. It is then no surprise that China is also the world's biggest GHG emitter—it emitted 10.35 gigatonnes (Gt) of CO_2 in 2020 as compared to 5 Gt by the next top polluter, USA. In this way the rich parts of the world also "exported" their emissions to the balance sheet of "other" countries—called embedded emissions—and continued to consume goods at cheaper rates. In 2015, an individual in the US consumed 50 per cent more goods and services than in 1990.

The real tragedy is that rich countries did not reduce their emissions. So even as manufacturing moved to "other" countries, their emissions, driven by consumption of goods and electricity, continued to rise. At the same time, the emerging world, China, India, Brazil, Indonesia, Vietnam and all the "other" world exporters saw their emissions rise. This is why we are on the edge of the climate precipice today.

The EU wants to fix this through its carbon border tax. But it is ham-handed at best—deeply divisive and flawed. The fact is that the erstwhile proponents of free trade have changed colours; protectionism is on the rise as they want to manufacture domestically, and the EU is no different. But today, it's a different world. The former naysayers are vested in this system. They believe growth happens when they manufacture cheap and export to the world. So, how can this system be reformed through this one clumsy action? It will only add to the distrust between the old and the new producers of goods and emissions.

EU's carbon border tax won't take us towards a cooperative world required to combat climate change

Then, it is also a fact that the border tax will add to the revenue of the EU—the UN's Conference on Trade and Development (UNCTAD) estimates that at US $44 per tonne, the carbon border adjustment mechanism (CBAM) income, as it is called, will rise by $2.5 billion tonnes in the EU and fall by $5.9 billion for the exporting countries. It will further the inequity; and it won't go far enough to change the production-consumption pattern and reduce emissions.

The world cannot dodge the question of global trade and consumption anymore. It needs a carbon tax—enough to disincentivise consumption and to make production systems climate friendly. But the monies collected from this tax, including the EU carbon border tax, should be spent in countries worst impacted by climate change. If climate change is a global problem, so must be its resolution. The EU carbon border tax is neither here nor there in the way ahead. DTE @sunitanar

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Vol 30, No 6; Total No of Pages: 60

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Printed and published by Richard Mahapatra on behalf of Society for Environmental Communications. Printed at International Print-o-Pac Limited, B-204, 205, Okhla Industrial Area, Phase I, New Delhi-110020, India, and published at 41, Tughlakabad Institutional Area, New Delhi 110 062.

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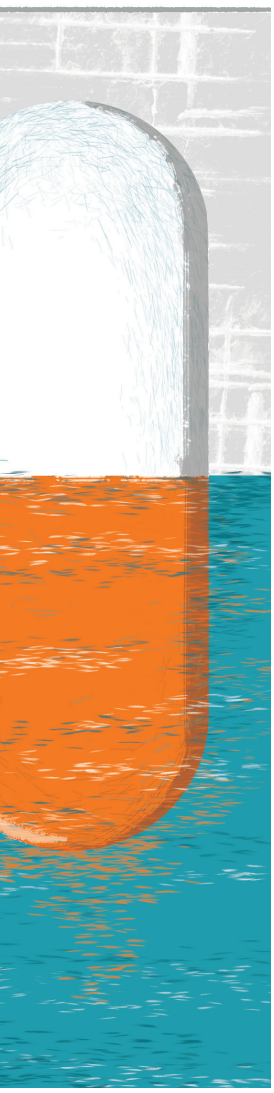
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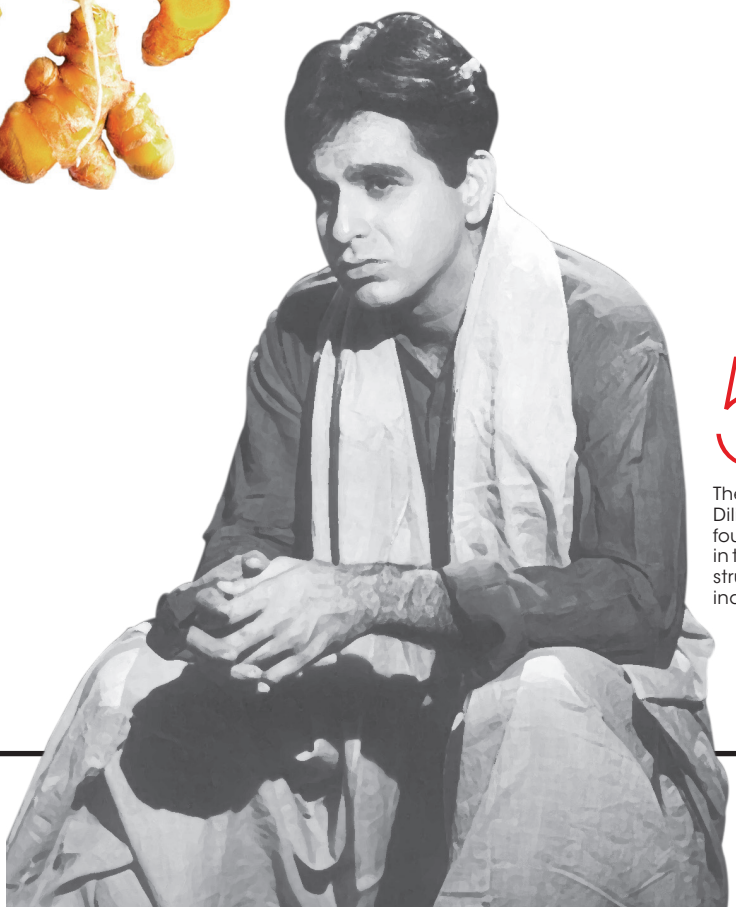


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Engage



PHOTOGRAPH: SOPAN JOSHI / CSE

A win-win solution to deal with stray cattle

This is with reference to "Cattle wise" (16-31 March, 2021). The article provides statistics related to the stray cattle population in the country and offers some solutions to this ubiquitous problem, which includes microchip implantation and genetic changes to reduce unproductive breeds. But this will still not be sufficient. There is one offbeat solution that is worth trying. Every village panchayat should set up an enclosure for stray cattle and keep them as draft animals which can then be used by farmers to cart their produce locally and to the markets. This will help cut diesel costs for running tractors and reduce the pollution associated with it. The panchayats can also make bio-manure from cattle dung and natural pesticide from cattle urine and sell to farmers. This will further help farmers reduce expenses incurred due to heavy reliance on chemical fertilisers and pesticides. Maintenance of the cattle and the enclosures can be brought under the aegis of the Mahatma Gandhi National Rural Employment Guarantee Act. The government can at least evaluate the effectiveness of this solution through pilot projects.

L R SHARMA
SUNDERNAGAR, HIMACHAL PRADESH

Clear picture needed

This is in reference to "Devil's Advocate: Are solar electricity and electric vehicles really 'clean'", published online on July 2, 2021. To get a better picture, the writer should have also included the emission numbers if the whole process of electrification is completely avoided. Would the emissions be more or less if we continue using fossil fuels?

ADITYA
VIA EMAIL

↘Europe has introduced legislations to stop manufacturing of fossil-fuel based cars in the near-term. But where will they get their electric batteries from? What is the cost-benefit ratio of alternative energy sources and of fossil-fuels, both in terms of net carbon emissions and in terms of actual cost? Answering these questions would help provide more context. Many individuals and groups are investing in rooftop solar panels and net meters. What are the advantages of these? Such doubts need clarification.

GOPAL
VIA EMAIL

Crops lying unused

This is with reference to the article "COVID-19 restrictions: No cheer for Odisha's maize farmers despite bumper harvest", published online on July 7, 2021. It is not the only Odisha that is facing such problems. In Etah, Uttar Pradesh, the bumper harvest of tomatoes is also going to waste. The tomatoes were earlier transported to Bengaluru, but difficulties in transportation, marketing and storage are disrupting the supply chain for farmers.

SURABHI
VIA EMAIL



PHOTOGRAPH: ROMOLA BUTALIA

More trouble for unstable environment

Apropos the article "Uttarakhand lets in: Migrants bring city, drop sustainability", published online on June 28, 2021. The article illustrates the apathy of city-dwelling workers to unstable climates. In the name of development, many groups will also try to profit from this, at the cost of the environment.

ACHLA SAWHNEY
VIA EMAIL

Keep up the focus on vaccines

This in reference to "COVID-19 vaccines: Some fully vaccinated people will still get infected—here's why", published online on May 18, 2021. According to Value Market Research, the global COVID-19 vaccine market is expected to grow at a compounded annual growth of 20 per cent between 2020 and 2026. With cases of COVID-19 still rising rapidly worldwide, there exists an urgent need for reliable drugs and vaccines to treat the infection.

SARITA
VIA EMAIL

Erratum

On *p*51 of the article "Weight of the dead" (16-31 July, 2021) the Ganga is incorrectly said to have a marine ecosystem. It has a freshwater ecosystem. The error is regretted.

DTE TV

Lightning strikes on the rise in last two decades

Over 60 people have been killed due to lightning strikes this year in parts of Rajasthan, Uttar Pradesh, Madhya Pradesh and West Bengal. People are struck



by ground currents that occur when electrical energy spreads after hitting a large object. Over the last two decades, lightning strikes have been on the rise, especially near the Himalayan foothills. They are expected to increase by 10-25 per cent in the near future. Yet, lightning strikes are the least studied natural phenomena, with only one team at the Indian Institute of Tropical Meteorology, Pune, tracking them.

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Digest

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1,000 WORDS VIKAS CHOUDHARY



Construction is in full swing near Rajpath, New Delhi, for the Union government's Central Vista project. The project includes a new Parliament building, a common Central secretariat, conference facilities and new residences for the prime minister and the vice president. In June, the Supreme Court dismissed a plea against a high court order that allowed construction during COVID-19's second wave. Activists have also raised concerns that the project would ruin green public spaces in the national capital.

FOR MORE PHOTOS, SCAN

Home for the abandoned

A transgender woman diagnosed with HIV in 1987 has run a home for children living with the disease for nearly two decades now

ANIL ASHWANI SHARMA

HIV/AIDS has been prevalent in India since 1986. Despite the advancements in scientific knowledge about the disease, the social stigma associated with it persists even today, making life difficult for those diagnosed with the condition. This is unfortunately also true for children living with HIV/AIDS, who are often abandoned by their families and left to fend for themselves at a young age.

But in Chennai, Tamil Nadu, transgender woman Noori Mohammed has turned messiah for 400 such children in the past two decades, by taking them under her wing. She takes charge of their education, medical expenses and trains them in basic skills until they are able to find a job or source of income for themselves. Her efforts to care for and support these children have earned her the title of Noori *amma* (mother) among the local community.

"Right now I have 45 children living with me," she says. "They are not just from Chennai; people from all parts of the state call and ask if they can leave their children with me. I try to never say no, but I only have limited space and resources," she says. Her wards currently live in a shelter home she built for them in Chennai.

Noori's empathy for these children stems from her own experience of living as a person shunned by society for having contracted HIV/AIDS. She recalls being diagnosed as HIV positive on July 22, 1987—making her the third person in India and the first in the transgender community to be diagnosed with the condition, as per media reports of the time. "At first I could not believe it, but then people around me kept saying how terrible it was that I got this disease. That is when it hit me," she says.

To learn how to care for herself and others living with HIV/AIDS, Noori worked in a hospital in Chennai as a nursing attendant. There, she came to know about the practice of parents anonymously leaving their newborns diagnosed with the disease in the hospital, and began to adopt these infants. "The cycle continues since then. Even today, many of the children I care for are those left on my doorstep," she says.

In 2005, Noori established the SIP Memorial Trust—named after Selva, Indira and Palani, three of her friends who succumbed to AIDS—and formalised her work. The Trust runs on financial support from Noori's friends and acquaintances, corporate donations and even politicians and actors working for the cause.

Under the Trust, Noori also conducts support and awareness programmes for adults. "I visit rural areas where HIV/AIDS is rampant and teach people how to properly care for patients. Companies also invite me for talks. It is only through all of these activities that people like me can debunk misconceptions about the disease and live as part of the society," she says.



WORLD

Olympics go green, but not enough

THE 2020 Olympics in Tokyo, Japan, which finally opened on July 23 this year after a prolonged delay amid the COVID-19 pandemic, have the ambitious goal of being the "greenest Games ever". Organisers have taken various measures to ensure this, such as using recycled cardboard beds for the athletes, ensuring proper waste management protocols at the venues, and even repurposing electronic waste to make winners' medals.

All this has resulted in the Games bringing their projected carbon dioxide emissions to 2.73 million tonnes, as per the *Sustainability Pre-Games Report* recently updated by the Tokyo 2020 organisers. This figure does not exclude the environmental impact of spectators, who are officially restricted from the Games to curb the spread of COVID-19. Hence, the final emissions—that will be calculated after the Olympics end on August 8—are likely to be much lower.

However, environmentalists are not satisfied with the "greenness" of these Olympics. For one, the report says that the organisers plan to offset the emissions by purchasing carbon credits equivalent to 4.38 million tonnes of carbon dioxide—essentially achieving carbon negativity. This approach is often criticised as a quick fix for big polluters rather than a legitimate move toward enforcement of environmentally sound practices.

The sourcing of vast amounts of perishable food for teams also sparked concerns.



Emissions scoreboard

Total projected carbon dioxide emissions (pre-Games)
2.73 million tonnes

Projected **reduction** from absence of spectators
340,000 tonnes

Projected **reduction** from renewable energy, recycling
280,000 tonnes

Projected **increase** from COVID medical facilities
1,000 tonnes

Total carbon credits bought to offset emissions
4.38 million tonnes

Source: Sustainability Pre-Games Report (July 2021)

DISEASES

Wildlife, meat trade on a pause to curb zoonoses

WITH COVID-19 and other zoonotic infections spreading at a rapid pace globally, countries are increasingly looking to prevent new diseases within their borders by imposing restrictions on wildlife trade and meat imports. The US, for instance, has temporarily banned the import of dogs beginning July 14 from 113 countries that show high risk of rabies, which the country considers a zoonotic disease of concern along with the plague. Similarly, China has initiated stricter monitoring of wildlife trade, which it suspended last year amid COVID-19, after confirming on July 18 the country's first human infection and death due to the rare Monkey B virus, a type of herpesvirus. In Ghana, an outbreak of bird flu in three regions prompted the government to ban imports of poultry and its products from neighbouring countries; while Russia has banned imports of animal feed additives from eight countries since last year, citing quality concerns.

WATER

Need to revisit hydro projects on Mekong river

THAILAND, LAOS and Cambodia can meet their energy demand and carbon dioxide emission targets for 2016-2037 by constructing only 82 per cent (14.5 GW) of the planned 17.6 GW hydro power plants on the Mekong river, says a July 6 *Nature Communications* study. For this, the countries need solar PV and cross border power trading, which could increase cost by up to 2.4 per cent but would "substantially limit the fragmentation of additional river reaches". This study assumes significance amid rising concerns of the ecological disruption of the river. The Mekong flows through China, Myanmar, Laos, Thailand, Vietnam and Cambodia and is an important source of electricity. China has built 11 giant dams on it and has partnered with Cambodia for another 140, threatening the rich biodiversity of the river and the livelihood of 60 million people. The Mekong River Commission, an inter-governmental body, says water level was at its lowest in 2019.

QUERY

Shield volcano in Iceland

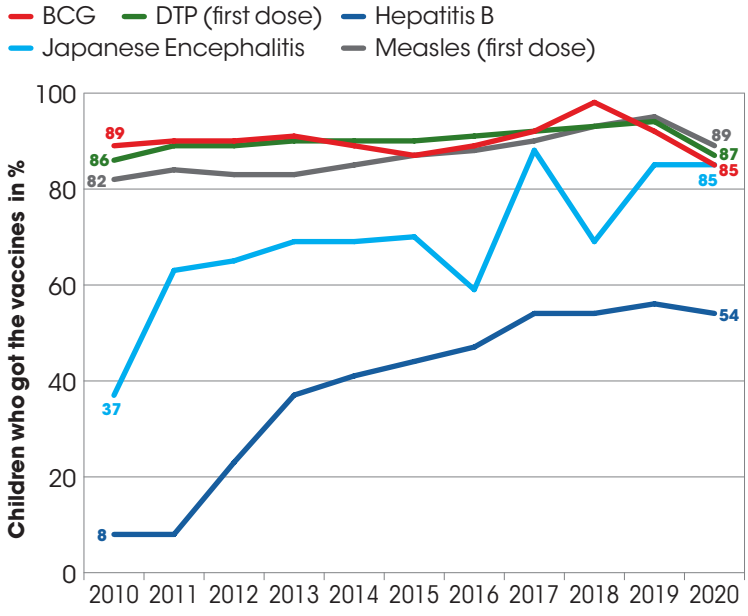
1 What is a shield volcano?
It is a type of volcano made up of fluid lava called basalt, which flows gently and spreads in a broad, sloping manner, looking like a warrior's shield from afar. Unlike composite volcanoes, which are formed of rock, ash and debris and result in massive eruptions, shield volcanoes are non-explosive.

2 When did Iceland get a shield volcano?
On March 19, 2021, the Fragdalsfjall volcano in the Reykjanes peninsula erupted after lying dormant for 6,000 years. Four months later, the volcano continues to pour lava that now covers more than 3 sq km, forming a shield volcano. Geologists say it is providing new insights on magma flows beneath the Earth's surface.

3 Can this shield volcano cause harm?
Due to their non-violent eruptions, shield volcanoes pose little to no risk to humans. However, the lava can destroy agriculture and infrastructure as it spreads. In Iceland, there are concerns that lava from the new volcano may move southwards into the Atlantic Ocean.

TRACKER

Routine immunisation of children in India took a major hit during the pandemic, undoing years of progress. As per July 15 estimates by the **World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF)**, over 3 million children did not get the first dose of Diphtheria-Tetanus-Pertussis (DTP) vaccine dose in 2020, the most of any country



Source: WHO/UNICEF Joint Estimates of National Immunization Coverage

BITS GLOBAL

Greenland on July 15 announced that it is suspending all oil exploration in the Arctic region in wake of the global climate crisis. There could be 17.5 billion undiscovered barrels of oil and 4,191 cubic km of natural gas off Greenland, as per the US Geological Survey. However, the country's government has decided to shift focus to renewable energy sources, it said in a statement.



The EU on July 14 revealed its plans to impose the world's first carbon border tax on import of steel, cement, fertilisers and other carbon-intensive products. The tax will be phased in from 2026. A transitional phase from 2023-25 will require importers to monitor and report their emissions. Meanwhile, in the US, Democratic senators on July 19 also proposed a border tax for importing countries failing to meet US carbon emission standards. The levy would be enforced from 2024.

Nine Brazilian states are negotiating with international organisations for aid to combat deforestation, circumventing the federal government. Under the Plano de Recuperacao Verde or Green Renewal Plan announced on July 17, these states that are either wholly or partially in the Amazon region aim to curb illegal deforestation, generate employment and transition to a greener economy.

Israel put forward a plan on July 19 to double taxes imposed on disposable plastic products like utensils, cups, bowls and straws, in a bid to reduce their use. The government estimates that this could lower the use of disposable plastics by 40 per cent. It said that an Israeli citizen currently uses an average of 7.5 kg of disposable plastic products a year, five times more than an EU citizen. If approved, the plan will come into force in 2022.

BITS INDIA

The Union government on July 16 exempted drug manufacturers from stringent environmental clearance processes till December 31, 2021, in view of the COVID-19 pandemic and the imminent third wave in the country. The government has put all proposed activities related to active pharmaceutical ingredients under the "B2" category of projects, which do not require environmental impact assessment and public hearings; hence, such proposals can obtain green clearances quickly.

Defence Minister Rajnath Singh on July 15 launched an artificial intelligence-powered application for grievance redressal. The Centralised Public Grievance Redress and Monitoring System Portal is being developed by the Union Ministry of Defence and the Indian Institute of Technology-Kanpur. The application will automatically analyse public complaints, their geographies and reduce human intervention for solutions.



In a bid to promote vaccination against COVID-19 and to curb the spread of the infection, the Nagaland government on July 17 ordered all government staff to get the shots or submit a negative COVID-19 test report every 15 days. Employees that fail to do so will not receive their salary and will be sent on unpaid leave, a government order said. The order came with the notification of the third phase of unlocking in the state, after a summer of restrictions to curb COVID-19.

The Chhattisgarh Cabinet has approved on July 20 the auction of 17 coal blocks identified by the Centre, triggering concerns about the potential impact of mining activities on wildlife and the environment. The blocks are located in areas that are rich in biodiversity and are home to several elephants, sloth bears and leopards, say activists. They claim that auctioning the blocks is unnecessary as there is no increase in demand for coal in the state.

FRAMEWORKS

■ The Ministry of Environment, Forest and Climate Change issued the **Environment (Protection) Second Amendment Rules, 2021** to allow use of coal middling and rejects by thermal power plants that comply with emission and fly ash norms. Coal middling and rejects are by-products of coal washed to remove impurities.

■ The Ministry of Agriculture and Farmers Welfare has issued the **Fertiliser (Inorganic, Organic or Mixed) (Control) Fifth Amendment Order, 2021**. The order revises the time given to laboratories to conduct analyses of fertilisers, as well as the protocol for communication of the results.

■ The Gujarat Chief Minister has announced the **Gujarat Electric Vehicle Policy 2021** that aims to enhance the use of electric vehicles (EVs) over four years by offering subsidies to new EV buyers and to those investing in related infrastructure.

IN COURT

NATIONAL GREEN TRIBUNAL

■ In a matter related to illegal blasting and mining in Bhilwada, Rajasthan, which damaged 375 houses, the National Green Tribunal (NGT) has ordered the mining company, Jindal Saw Ltd, to compensate the affected households with ₹1 lakh each.

■ NGT has asked the Central Monitoring Committee formed by the Union Ministry of Environment, Forest and Climate Change (MoEFF&CC) to handle the country's Project Elephant, to investigate media reports stating that night and early morning trains cause the most pachyderm deaths.

■ NGT has asked MoEFF&CC to file an affidavit in a matter related to the illegal felling of trees in the forest area of Bichabhanga on the periphery of the Gorumara National Park in Jalpaiguri, West Bengal, for the construction of an overbridge.

SUPREME COURT

■ The apex court stayed a February 19, 2021 NGT order to form three committees to look into the damage of the blowout of the Baghjan 5 oil well in Assam on May 27 last year. The court noted NGT already constituted a panel on the matter last year; more will only delay the legal process.

HIGH COURTS

■ In a case related to embezzlement of funds allocated to build toilets in Etahar village, Bhind district, under the Swachh Bharat Mission, the High Court of Madhya Pradesh ordered state authorities to ensure proper implementation of public schemes.

■ The High Court of Kerala asked the state government to fix the price that oxygen suppliers can charge to transport cylinders during the pandemic. The court said the earlier orders capping prices of oxygen are redundant if transport cost is not fixed.

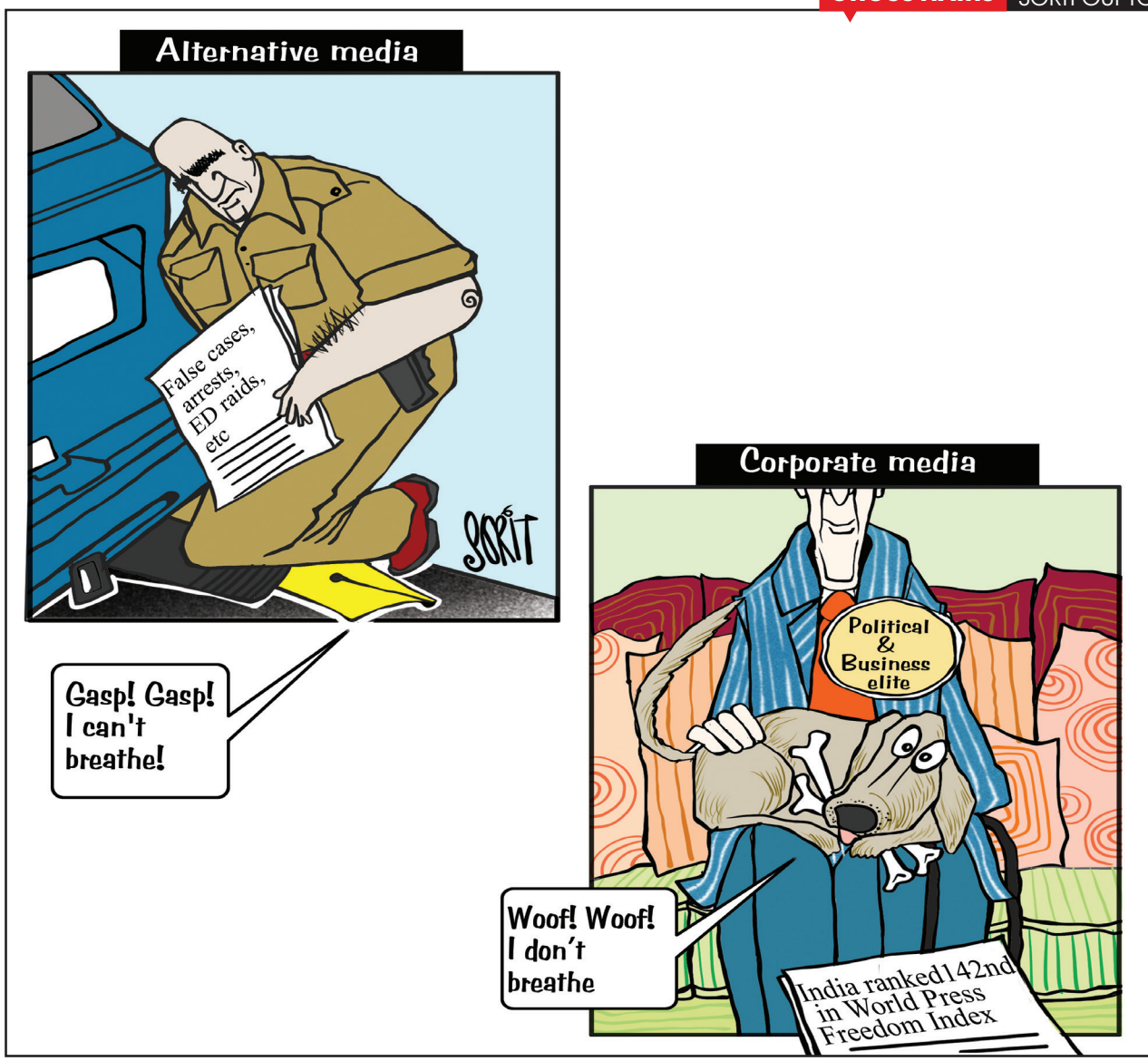
So far...

Number of cases on environment and development tracked from January 1 to July 19, 2021

NATIONAL GREEN TRIBUNAL	SUPREME COURT	HIGH COURTS
238	67	126

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BIG NUMBER

US $3 trillion

spent globally since April 2020 on interventions to counter the economic impact of COVID-19 that would harm the environment. In comparison, only **$1.8 trillion** have been spent globally on green projects during the same period.

Source: Greenness of Stimulus Index (July 2021) *by Vivid Economics and Finance for Biodiversity*

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DAVID SASSOLI

President, European Parliament, on the European Commission's "Fit for 55" climate plan announced on July 14. The plan sets a collective goal for the 27 EU countries to reduce net greenhouse gas emissions to 55 per cent of the 1990 levels by 2030

Compiled by Aditya Misra, K M Sheeja, Susan Chacko, Sanjit Kumar and Dakshiani Palicha



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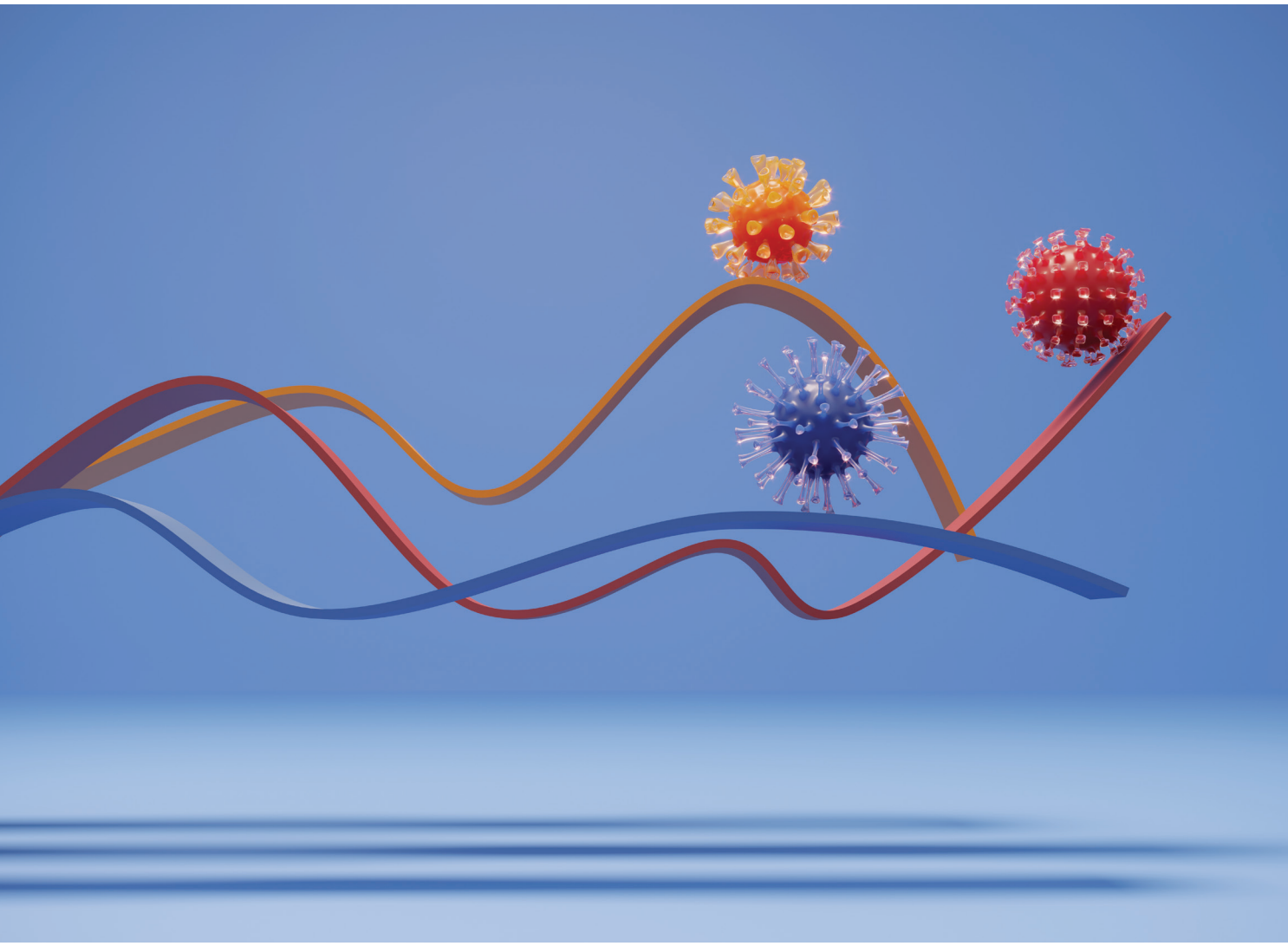
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Deal with Delta

The global dominance of the Delta variant shows that mutations have kept SARS-CoV-2 ahead of the game

VIBHA VARSHNEY
NEW DELHI

RESEARCHERS HAD predicted that 2021 would become the year of variants. It has. Currently, there are four variants of concern, as per the World Health Organization (WHO), of which the Delta variant, implicated in India's second wave of infections, has been reported from 124 countries and is set to become the most dominant variant circulating in the world.

The variant was first isolated in India in October 2020. On April 4, 2021, WHO labelled it a variant of interest and on May 11, 2021, upgraded it to a variant of concern. In the UK, it forms 99.3 per cent of the sequenced samples in

the four weeks preceding July 23 (see 'Fast-spreading variant', *p*18), while in the US, it is 73.7 per cent of the sequenced samples in the same period, as per the Global Initiative on Sharing Avian Influenza Data (GISAID), an online repository of genomic data from flu viruses.

Mutations have helped the virus dominate across the world. "Compared to the Wuhan strain, the Delta variant has nine mutations in the spike proteins that help the virus gain entry into the cell," Olivier Schwartz, head of the Virus and Immunity Unit at Institut Pasteur, France, tells *Down To Earth* (DTE). "The Delta variant is significantly more transmissible than the original (Wuhan) SARS-CoV-2 and the average infected person can infect more people, spread the disease faster and overwhelm local healthcare systems," says Francis P Wilson, associate professor of medicine and director, Clinical and Translational Research Accelerator at Yale University School of Medicine, Connecticut, US. So far, it is unclear if the Delta variant is more pathogenic than other variants, and its death rates seem similar to that of the other variants, which is a good news, explains Wilson. The data is not yet clear on whether there is an immunogenic breakthrough, which indicates if people who have immunity due to prior infection or vaccination, are at risk from Delta variant or not, he says.

As more and more mutations accumulate, SARS-CoV-2 could come to a point that it becomes a new virus. But has that time come? "No, it has not," says Satyajit Rath, immunologist and visiting professor at Indian Institute of Science Education and Research, Pune.

While it is true that a large percentage of genetic sequence changes will "make" a new virus, the proportion of changes in SARS-CoV-2 variants is quite small so far. The proportion of change in the genetic sequence of the virus indicates its familial lineage relationships. It does not indicate or correlate with the changes in virus behaviour (such as more transmissibility), since changes in behaviour depend on the locations of the genetic changes, rather than on the amount of the genetic changes, says Rath.

VACCINES EFFECTIVE

Despite these mutations, studies show that vaccination can protect from the Delta variant, even if the levels of protection have fallen.

DESPITE THE MUTATIONS, STUDIES SHOW THAT VACCINATION CAN PROTECT FROM THE DELTA VARIANT. HOWEVER, VACCINATION LEVELS REMAIN LOW GLOBALLY, WITH ONLY 25.9 PER CENT OF THE POPULATION RECEIVING ONE DOSE.

Researchers from Indian Council of Medical Research (ICMR) studied 677 vaccinated people who contracted COVID-19. Genomes of 511 of them were sequenced, which indicated that Delta variant sickened 86 per cent of them. These people had received Covaxin, Covishield or the Sinopharm vaccine. However, all the vaccines seemed to have prevented severe cases and only 9.8 per cent of them had to be hospitalised, while only 0.4 per cent died. The preprint of this study was published on the online repository *MedRxiv* on July 15.

In the UK, blood and swab samples collected for the SARS-CoV-2 (COVID-19) Longitudinal Study, a long-term observational study on 6,000 participants to investigate susceptibility, transmission and disease severity, were used to track the risk of infection in people vaccinated with Pfizer/BioNTech's vaccine. The researchers analysed antibodies in the blood of 250 healthy people who received either one or two doses of the vaccine, up to three months after their first dose. They found that in people who had been fully vaccinated with two doses of the vaccine, levels of neutralising antibodies were five times lower against the Delta variant when compared to the original strain, upon which current vaccines are based. Importantly, this antibody response was even lower in people who had only received one dose, the researchers reported in *The Lancet* on June 3.

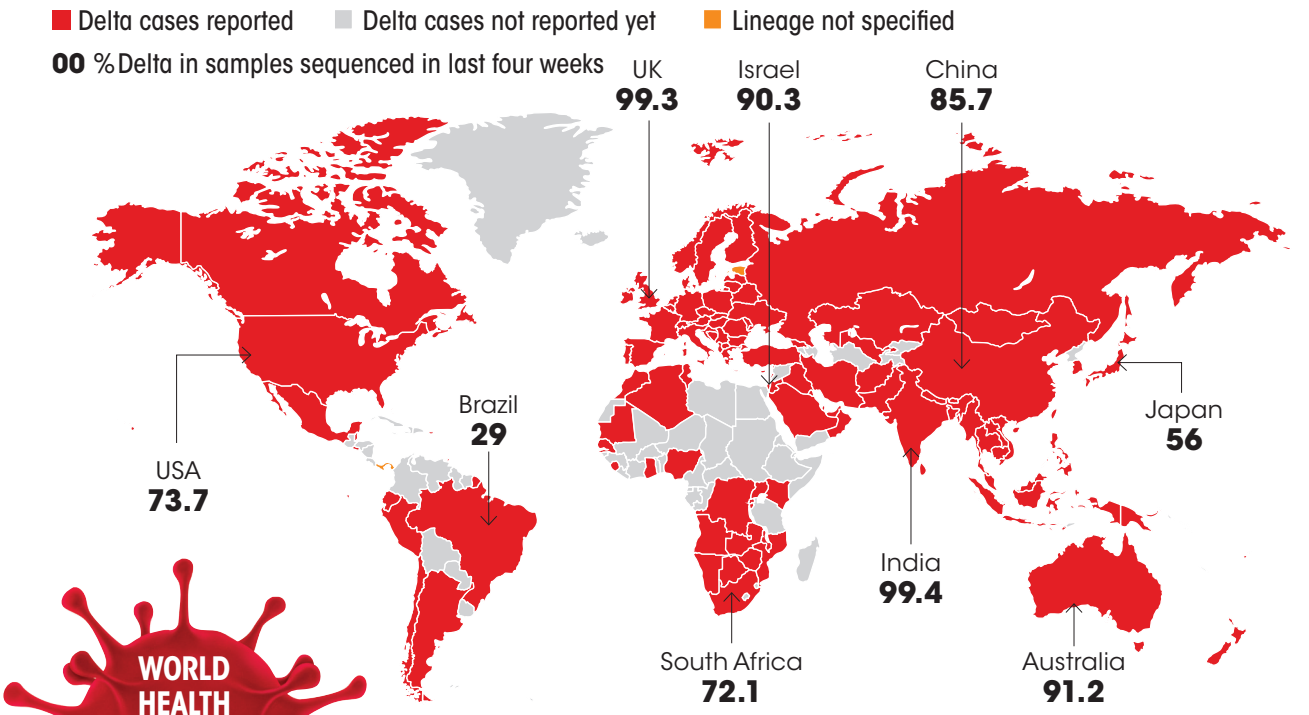
Similar studies by the group using the vaccine made by Oxford-AstraZeneca showed that the levels of neutralising antibodies were lower than those generated by Pfizer/BioNTech's vaccines. This was published in *The Lancet* on July 17, 2021.

THIRD WAVE

Ensuring that vaccines are effective against the Delta variant is important as the risk of the third wave is imminent. "Though the R value (reproduction number) is below 1 at present, it went up from the all-time-low of 0.78 between mid-May and late June to 0.88 by end June," Sitabhra Sinha, professor at the Institute of Mathematical Sciences, Chennai, tells

FAST-SPREADING VARIANT

As per cent of COVID-19 samples sequenced, Delta is becoming the world's dominant variant



WORLD HEALTH ORGANIZATION'S FOUR VARIANTS OF CONCERN

Alpha
Earliest documented sample: UK, September 2020
Date of designation: December 18, 2020
Reported in: 180 countries

Beta
Earliest documented sample: South Africa, May 2020
Date of designation: December 18, 2020
Reported in: 130 countries

Gamma
Earliest documented sample: Brazil, November 2020
Date of designation: January 11, 2021
Reported in: 78 countries

Delta
Earliest documented sample: India, October 2020
Date of designation: May 11, 2021
Reported in: 124 countries

Source: Global Initiative on Sharing All Influenza Data (GISAID) data as on July 23, 2021; World Health Organization COVID-19 Weekly Epidemiological Update Edition 49, published on July 20, 2021

DTE. The reproduction number is a measure of how contagious a disease is. If the R value is more than 1, it means that each existing infection causes more than one new infection.

The R value went up to 0.98 between July 6-10 but then fell to 0.92 during July 10-13, Sinha says, adding that after July 13, the data is fluctuating too much to get a robust estimate; but it looks to be hovering around 0.95.

"We have to see whether it again comes close to 1 in the next few days and the longer it stays close to 1, the higher the risk of a chance event pushing a new increase in cases, the so-called third wave," he says.

WHO's International Health Regulations (2005) Emergency Committee indicated on July 15 that more dangerous variants are likely to emerge and spread across the world. Experts say the only way out of the situation is vaccination. However, vaccination levels remain low globally, with only 25.9 per cent of the population receiving one dose. In India, vaccination rates are low, too, with less than 24 per cent of the people having received one dose, and less than 6 per cent of the people being fully vaccinated.

The country needs, and has needed from day one, equitable and rapid vaccination to limit severe illness and misery, and to limit what appears to be a patchwork situation of populations with high and low levels of vaccination, says Rath. DTE

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Model failure?

Wrong projections by forecast models and the changing nature of the monsoon season are some of the major reasons behind India's incorrect predictions

AKSHIT SANGOMLA
NEW DELHI

THE INDIA Meteorological Department (IMD) is in a quandary, as farmer associations from Madhya Pradesh are planning to take it to court. The cause of the dispute is IMD's faulty monsoon forecast, based on which the farmers sowed their seeds early this year.

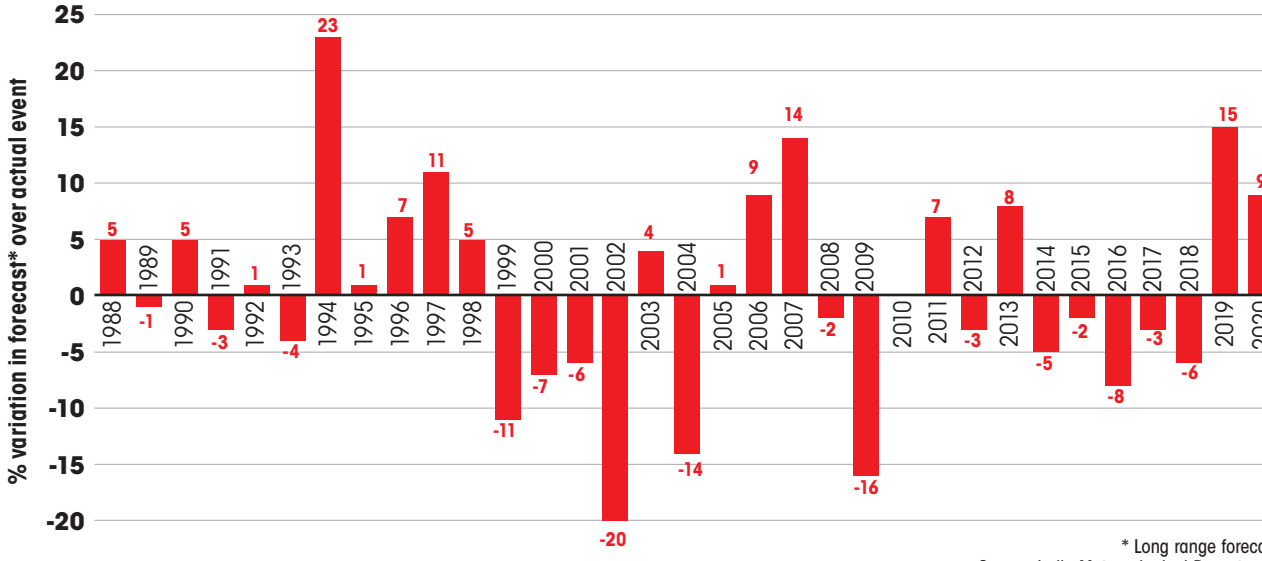
This monsoon season has dealt a huge blow to IMD's prediction accuracy. Its forecasting slip on June 13 was perhaps the most problematic. The agency predicted the arrival of monsoon rains in the northern states of Rajasthan, Delhi, Haryana, Punjab and western Uttar Pradesh by June 15. These states got their first monsoon showers only on July 13. This was, unfortunately, not the only wrong prediction—though the agency on July 12 called the slip "rare and uncommon" for its numerical modelling system.

IMD's history of predictions, however, suggest otherwise. The agency makes three kinds of monsoon forecasts: long range (for a month or the entire monsoon season); extended

PHOTOGRAPH: VIKAS CHOUDHARY / CSE

OFF TRACK

Barring 2010, India has failed to correctly forecast its monsoons every year since 1988



* Long range forecast
Source: India Meteorological Department

range (for 10 days to a month); and short (up to 3 days) to medium range (3-5 days). The department's website claims that the accuracy rates of long range and short to medium range forecasts are high, while it struggles with the "difficult" extended range, which is the most important of all time scales for the economic and agricultural sectors.

IMD currently uses the Monsoon Mission Coupled Forecasting System (MMCFS) for its predictions, a technology that it upgraded to in 2017. The upgrade, in fact, seems to have made things worse. Between 1988 and 2016, the department's long range forecast was, on an average, 7 per cent away from the actual rains each year. This gap increased to 8 per cent between 2017 and 2020 (see 'Off track').

CONSTANT CHANGE

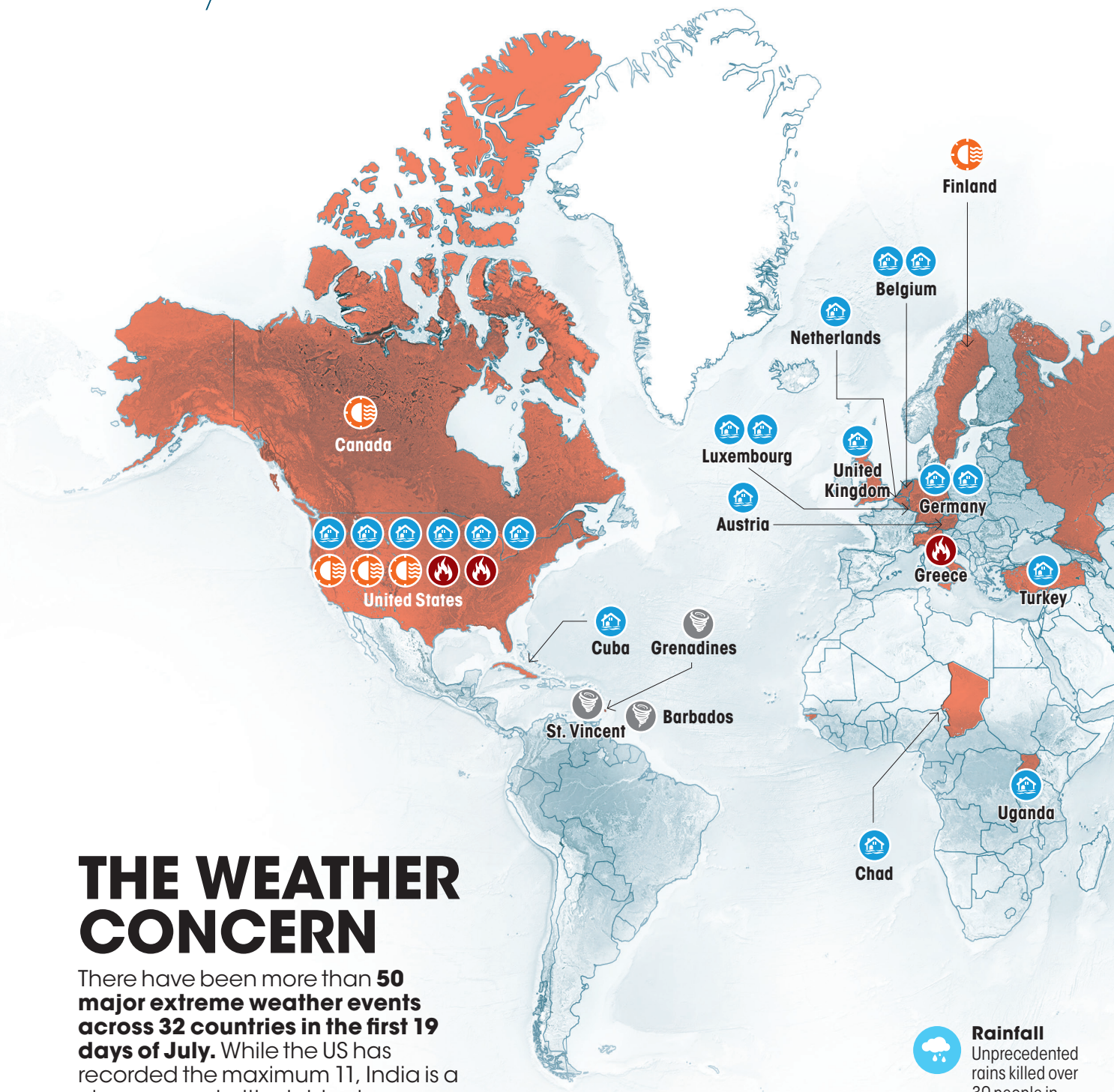
While there is no doubt that the forecasting technology has improved over the years, experts warn that it has failed to keep pace with the changing nature of the Indian monsoon. "MMCFS is capable of factoring in multiple variables. The challenge, however, is that the resolution of the model is too coarse to include localised events such as cyclones, or the temporary formation of low-pressure troughs," says Raghu Murtugudde, a climate scientist at the University of Maryland, US.

In such a situation, the representation of the process at a smaller scale such as the formation of clouds is done using heuristic methods that are imperfect and can lead to biases, says Sandeep Sukumaran, assistant professor, Centre for Atmospheric Sciences at the Indian Institute of Technology, Delhi.

This is a huge limitation as the South West Monsoon, one of the most stable weather systems on the planet, has been showing unusual behaviour in the past few years. One of the reasons for this is the recent rise of localised weather events and their temporary but intense influence on the monsoons.

The onset of the monsoon happened almost on time (June 3), due to the formation of two back-to-back cyclones, Tauktae in the Arabian Sea and Yaas in the Bay of Bengal. Historically, cyclones at the start of the monsoons are rare; however, they have now appeared in three consecutive years starting 2019. "The cyclones dragged the monsoon trough onto Kerala and it met the definition of the onset. But were the large-scale conditions really favourable to keep the trough moving? Clearly, not. This happened last year too," says Murtugudde. In 2020, the pre-monsoon period saw cyclones Amphan in the Bay of Bengal and Nisarga in the Arabian Sea. In 2019, cyclone Vayu influenced monsoon onset and progress.

This year, a number of local factors led to the monsoon delay in North India. "There were lower-than-usual temperatures in northern Pakistan and India. So it took longer for the temperature to reach



THE WEATHER CONCERN

There have been more than **50 major extreme weather events across 32 countries in the first 19 days of July.** While the US has recorded the maximum 11, India is a close second with eight extreme weather events

Rainfall
Unprecedented rains killed over 30 people in Mumbai on July 19

Floods
There have been 38 floods with the most events reported in the US

Heatwaves
July saw at least six heatwaves, which swept across the cold northern hemisphere in June

Hurricane
At least three Caribbean countries reported widespread devastation due to hurricanes

Lightning
India reported the lone major lightning event in Rajasthan that killed 38 people in 24 hours

Wildfire
At least four wildfires were reported in the US, Greece and Russia



Infographic: Sanjit Kumar; Analysis: Kiran Pandey and Rajit Sengupta
Compiled by DTE-CSE Data Centre from news articles published between June 1 and 19, 2021

to levels conducive for the monsoon," says Elena Surovyatkina from the Potsdam Institute for Climate Impact Research in Germany.

Murtugudde points out that the overall warming of the northern hemisphere could have also impacted the monsoon trough (see 'The weather concern').

There are some other gaps in the current modelling system.

The first is the deviation of the average monsoon model from real average rainfall data. When IMD generates a forecast, it calculates how much rainfall a region could receive during any time period (week, month or season). When these values are compared with the actual rainfall during that time period, the model values do not match. This is known as systematic bias. When the model is corrected for this bias, its ability to forecast the variations in monsoon rainfall over the years becomes difficult.

The second is the lack of understanding about the impact of sea surface temperatures on monsoon wind systems. Sea surface temperatures have been rising because of global warming. These gaps can be corrected by getting more observational data from the boundary and upper layers of the atmosphere.

Forecasting is becoming increasingly difficult due to climate change, which has lead to increased frequency of extreme rainfall events and made the monsoon more variable. One can only hope that the technological advancements made through artificial intelligence and machine learning to improve the representation of smaller-scale processes in climate models will be the welcome break we are waiting for. DTE

@Aks7489



A worker sorts wool at Rajasthan's Bikaner *mandi*, considered one of Asia's largest wool markets a decade ago

SHEAR DESPERATION

India's once thriving wool economy now depends on imports to sustain demand. Will the recent import of Australian Merino sheep for crossbreeding be enough to revive the sector?

SHAGUN KAPIL
BIKANER, RAJASTHAN

BY THE end of this year, shepherds in Uttarakhand will get a batch of lambs through crossbreeding of sheep indigenous to the region with Australian Merino sheep, known to have the softest and finest wool used for apparels. These lambs will be the first signs of success of an import exercise that the government resumed after 30 years, in 2019, with an aim to boost the pastoral economy and reduce the country's import dependence for raw wool. The last import was of Rambouillet sheep from the US in 1993. Its purpose was crossbreeding, which happened to officials' satisfaction; however, low survival rates of imported sheep and limited success in obtaining wool deterred further exercises. "This time, to lower mortality rates, we have imported from areas in Australia that have similar climates as our Himalayan states," says Ashok Liladhar Bist, additional chief executive, Uttarakhand Sheep and Wool Development Board.

Of the 860 Australian Merino sheep imported between December 2019 and February 2020 under the National Livestock Mission, Jammu and Kashmir has received 420, Uttarakhand 240 and Himachal Pradesh 200. Plans are also underway to import sheep for Rajasthan, the country's largest wool producer known for its superior carpet

PHOTOGRAPHS: VIKAS CHOUDHARY / CSE



Australian Merino sheep

grade *Chokla* and *Magra* wool. Carpet grade is rougher than apparel grade and accounts for 85 per cent of India's production. Apparel grade wool accounts less than for 5 per cent of production, and coarse grade fit for making rough blankets accounts for the rest. The main trigger for import, says Bist, is deteriorating quality and quantity of carpet and apparel grades, largely due to inbreeding.

SCARCITY AMID PLENTY

The import comes as a surprise as the country has the third largest number of sheep in the world with 74.26 million sheep under 42 registered breeds, as per the 20th Livestock Census in 2019. This was a 14.1 per cent increase from the previous census in 2012. But a clear picture emerges as one probes into the sheep economy.

Data with the Union Ministry of Textiles suggests that as of 2018-19, the average annual yield per sheep in India was 0.9 kg as against the world average of 2.4 kg. The country produced 40.42 million kg of wool that year, whereas its consumption was at 260.8 million kg in 2019-20. Due to this insufficient domestic production, India depends on imports for raw wool, particularly on Australia and New Zealand. This wool is then used to prepare products like carpets, yarn, fabrics and garments for domestic market and for exporting, especially to the US and Europe.

One reason for this disparity is that despite the overall rise in sheep population, their numbers are declining in major wool-producing states like Himachal Pradesh, Rajasthan, Gujarat, Andhra Pradesh, and Jammu and Kashmir. This decline has spilled over into wool production and trade. Let's consider Rajasthan, whose sheep population declined by 13 per cent from 9.1 million in 2012 to 7.9 million in 2019. Historically, the state has been a wool hub, accounting for 40 per cent of all domestic production. Its *mandi*s play a central role in the sector; 10 years ago, the Bikaner *mandi* was one of the largest wool markets in Asia. Currently it sells both wool and grain since the former is no longer sustainable.

A recent study by the Centre for Pastoralism, an initiative of Gujarat-based non-profit Sahjeevan, finds that in the 10 years till 2020, wool consumption by the country's processing units increased by 50 per cent, but the use of indigenous wool fell to almost 10 per cent of the total current sales in Bikaner. "We would prefer raw wool from domestic production. *Chokla* is a world-class carpet grade wool, but the quantity produced would not be enough for even 10 traders in Bikaner," Ashok Surana, owner of a spinning mill, tells *Down To Earth* (DTE). "The price for good imported wool is anyway the same as that of Indian wool," he says.

A decade ago, best quality wool fetched ₹100-200 per kg. Now it is ₹80-100 a kg, says Thakar Ram, a sheep farmer from Daniyasar village. He says auctions were transparent earlier; due to cartelisation prices are now fixed by buyers. Shepherds across the country face similar problems.

UNDO THE KNOTS

Experts think imports and cross-breeding are unlikely to provide any respite to shepherds and traders. There are several factors India must focus on to boost its wool economy.

The fact is indigenous wool has for decades suffered at the hands of machine-friendly long-stapled wool (a cluster of the fibre of greater

THE IMPORT OF AUSTRALIAN MERINO SHEEP TO UTTARAKHAND, HIMACHAL PRADESH, JAMMU AND KASHMIR IS THE FIRST IN AROUND 30 YEARS; IT'S AIMED AT IMPROVING WOOL QUALITY

length) after India set up mechanised spinning mills in the 1970s and 1980s. Around late 1980s or early 1990s, import tariffs were lifted as India began importing long-stapled wool from Australia, New Zealand and West Asia, especially for apparels as it was finer and softer than the brittle indigenous wool. "Imports grew to an extent that even the carpet industry that absorbed Indian fibre began using them. Now, there is no offtake of wool from Gujarat or the Deccan states because it is short-stapled," says Sushma Iyengar, founder of the Kutch Mahila Vikas Sangathan, a welfare group in Gujarat that held exhibition of woollen crafts and products from Kutch in 2020.

Second, is the shift in farmers' focus from wool to meat (see 'Priority switch'). While sheep numbers are on a decline in wool-producing states, they are rising in Deccan states. Telangana promotes the meat-producing Nellore breed through a subsidised sheep distribution scheme, and the breed now comprises 51 per cent of the state's sheep. Meat prices are high at ₹400-500 per kg in local markets. "We get huge revenues from meat exports, so it has become more lucrative for shepherds as wool procurement is almost nil. All states have started promoting fatty breeds," says Iyengar. Since weight is key in finalising prices, shepherds often leave wool on to make the sheep look healthier. This wool is then either wasted or sold through unofficial channels.

Third, pastures are diminishing across the country with the increase in plantations as well as urbanisation. In Rajasthan, grazing land fell from 1.7 million hectares (ha) in 2007-08 to 1.6 million ha in 2017-18, as per state agriculture department data. Durga Ram, a fourth generation sheep farmer of Kotra village in Bikaner, tells DTE that till 10 years ago there was a lot of open space and grass in his and the adjacent Gajner village for sheep to graze on. "Now all that space is occupied by two private solar parks." When DTE met him, Ram's son was on his way to Kapurthala in Punjab, some 531 km from Kotra, with their 150 sheep in search of grass.

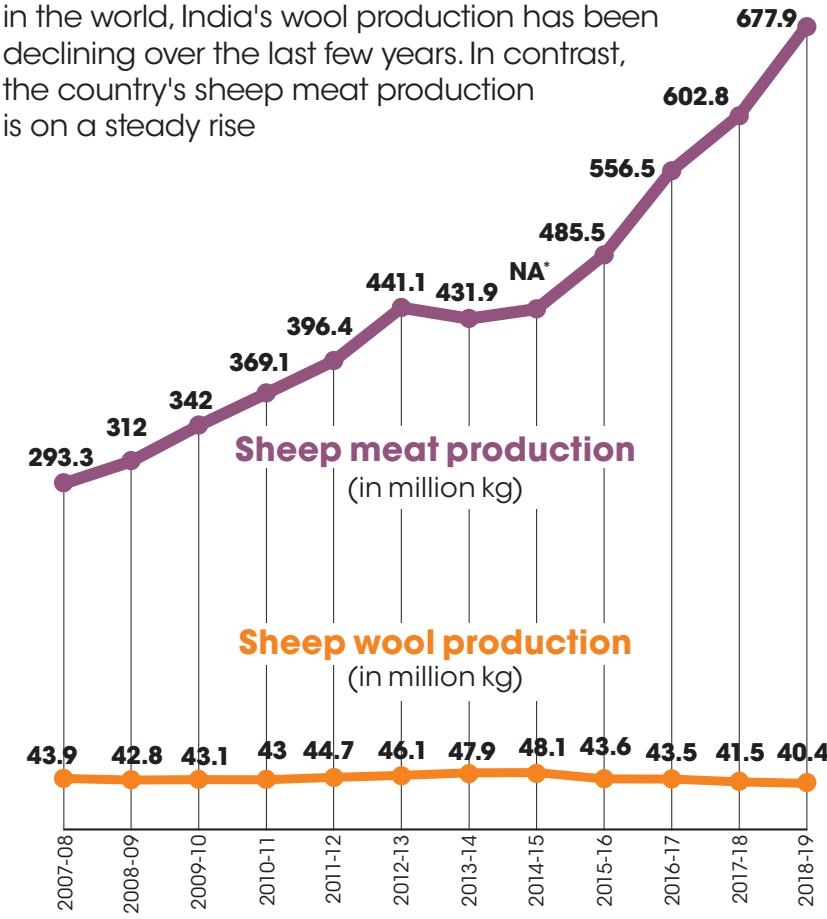
Grazing lands are shrinking in other states as well. In Gujarat, the indigenous Patanwadi breed is now less preferred by herders as encroachment and industrialisation have reduced flat grazing resources and these sheep are not good climbers, notes the study by the Centre for Pastoralism. There are less than 5,000 pure Patanwadi sheep left in Gujarat. Himachal Pradesh has abundant land, but access is difficult during the winter. In Uttarakhand and Telangana, pastures in forests are out of bounds, it adds.

"Shearing wool is unlike any other work. The younger generation does not want to do this. You may not find many sheep in the next few years," says Tola Ram, another shepherd in Kotra village.

Officials, on the other hand, say shepherds are reluctant to adopt modern practices like machine shearing. "Machine shearing takes

PRIORITY SWITCH

Despite having the third largest sheep population in the world, India's wool production has been declining over the last few years. In contrast, the country's sheep meat production is on a steady rise



*Sheep meat production data for 2014-15 is not available. Source: Agriexchange



A worker examines wool fibre at a carpet manufacturing factory in Bikaner

only five minutes and increases the length of the fibre too, since it cuts neatly from the skin. But there is low awareness. Farmers feel their sheep will be hurt. The need for uninterrupted electricity supply is also a problem in rural areas," says H K Narula, head, Arid Regional Centre, Central Sheep and Wool Research Institute, Bikaner.

However, he does admit that these machines are mostly imported and cost ₹1-1.5 lakh. "Even the blades and other parts are costly. The Union Ministry of Textiles and the Indian Institute of Technology-Delhi have come up with a cheaper machine that will cost ₹40,000-45,000, but it is still being tested," he says. Meanwhile, Uttarakhand has been promoting machine shearing for five-six years, says Bist. Some 25 per cent farmers opt for this approach now, as against 5 per cent three years ago.

Experts and officials also say sheep care has not got the same attention as other agricultural activities. "The type of research and time needed in this sector has not been provided. There is a scope of better processing and marketing of wool, and even a minimum support price (MSP), like in crops," says Narula.

Mohammad Sharif, former managing director of the erstwhile Jammu and Kashmir Sheep Development Board, says wool has not gained traction because of half-hearted support. "During my tenure at the wool board, we just procured wool from sheep herders and sold it to the textile industry. There was no value addition. There were no processing facilities or measures like washing, carding and grading which would have helped in its marketing. The board employees were also not paid on time," says Sharif, who is also former director of sheep husbandry in Jammu and Kashmir. The administration recently disbanded the board saying "there has been no significant on ground impact on production and marketing of wool and wool-based products."

The Union textiles ministry in one of its documents on the status of wool and textiles in India acknowledges that the constraints faced by the wool sector are due to outdated and inadequate pre- and post-loom processing facilities, the ineffective role of state wool marketing organisations, the lack of an MSP system and no educational institute for wool technology. The fact is most shepherds in the country rear sheep not by choice, but due to the lack of other options or because it is their traditional practice. There is a need to make this sector lucrative by raising awareness, improving access to pasture lands, facilitate marketing of wool, offer remunerative prices, and upgrade the supply chain for herders who are on the bottom rung of the ladder. DTE

@shagun_kapil

PANDEMIC OF STEROIDS



ILLUSTRATION: AJIT BAJAJ / CSE

Steroids are essential in fighting infectious diseases. Used recklessly, they can cause life-threatening side effects like mucormycosis, as was witnessed in the aftermath of the pandemic's second wave. COVID-19 is a new disease, and its treatments and dosages are constantly evolving. India will find it difficult to contain the disease unless the government can ensure timely dissemination and implementation of treatment protocols. A report by BANJOT KAUR



AJIT, a 45-year-old graphics designer in New Delhi, tested positive for COVID-19 in mid-April, when the country was in the grip of a devastating second wave of the novel coronavirus (COVID-19) pandemic. "Though my symptoms were mild, I reached out to a doctor as I wanted to cover my bases," he says. The doctor, too, wanted to ensure that Ajit's health condition did not deteriorate at a time when hospitals were full, and promptly prescribed him steroids with a cocktail of antibiotics and antivirals. Three months later, Ajit and his doctors are painfully aware of how much this decision, which seemed sensible then, has cost him. Ajit now battles against a host of new health complications, likely triggered by the steroids that gained popularity as a life-saver during the pandemic.

While treating infectious diseases, doctors usually monitor two important aspects: the viral or bacterial load in the body and the immune system's response to it. Monitoring the latter is particularly important in case of diseases like COVID-19 for which no effective treatment is available. The immune system, which is the sole fighter in this case, too, does not have any prior experience of eliminating the novel virus. So there is a risk that the immune system could get hyperactive while trying to fight off the contagion, and that the resulting inflammatory response—that releases white blood cells or macrophages to engulf and eliminate invaders like bacteria and viruses—assume a severe form. In case of an acute infection, the inflammatory reaction can even damage the body's own healthy tissues and organs, a condition known as cytokine storm that has entered common parlance since the onset of the pandemic. Steroids come to one's rescue during severe inflammation and cytokine storm. They assuage the hyperactive immune system and thereby, keep inflammation under control and block the deadly cytokine storm.

It is imperative that the drugs are prescribed only at the later stages of infection so that they do not weaken the immune response while it is still effectively combating an infection. The guidelines of the Union Ministry of Health and Family Welfare says a COVID-19 patient should be prescribed steroids only if s/he enters hypoxia—a condition where the oxygen saturation levels report a sudden and drastic fall and which usually sets in during the second week of the infection. An hyperactive immune response can activate factors that induce hypoxia, which in turn, can cause a cytokine storm.

Ajit was, however, is prescribed the medrol—the commercial name for the steroid methylprednisolone—in the first couple of days of showing symptoms, despite the fact that his oxygen saturation levels were at a healthy 95 per cent and body temperature was between 100°C and 101°C. These parameters indicate that Ajit was suffering from a mild case of COVID-19, where his immunity is able to fight off the infection. The low-grade fever could and should have been contained with paracetamol alone.

On the third day of treatment, Ajit's body temperature starts to rise and his oxygen saturation levels fall marginally to 94 per cent (against the optimum level of 95 to 99 per cent). The doctor doubles his steroid dosage—from the initial 16 mg a day to 32 mg. On the sixth day, Ajit develops a high-grade fever, with body temperature reaching 103°C. Though his oxygen saturation level remains steady, his steroid dosage is doubled again—now to 64 mg a day, administered intravenously to increase the efficacy. And the routine continues for another 13 long days till there are visible improvements in his condition.



In the intense second wave, when finding a bed was a luxury, mild use of steroids on moderately ill patients whose oxygen saturation levels had depleted, ensured that their condition did not turn severe and they did not require hospitalisation

Ujjwal Parakh
Pulmonologist, Sir Ganga Ram Hospital, Delhi

In the end, Ajit was on high doses of steroid for 20 straight days. The World Health Organization (WHO), in its guidelines on steroid use in COVID-19 patients, mentions that these drugs can be prescribed safely for only seven to 10 days.

STEROIDS' DARK SIDE

Steroids are essentially synthetic compounds that mimic various natural hormones in humans, and act as chemical messengers to regulate basic actions necessary to protect, nourish and maintain the body as well as functions of reproductive system. Synthetic steroids developed from sex hormones, primarily the male sex hormone testosterone, are known as anabolic steroids and are mostly used by athletes and bodybuilders to improve muscle mass and physical performance. The ones used in the treatment of COVID-19 and other infectious diseases belong to the group of corticosteroids. These are synthetic versions of the hormone cortisol produced by the adrenal glands, located on top of both the kidneys. Cortisol helps regulate our metabolism (how body uses carbohydrates, fats and proteins and converts those into energy); manages the immune system; regulates blood pressure and blood sugar levels; controls the sleep-and-wake cycle and response to stress; and reduces inflammation (see 'Handle with caution', on facing page).

The functioning of the hormone itself suggests that if used for long or in high potency, corticosteroids can



ILLUSTRATIONS: RITIKA BOHRA/ CSE

Handle with caution

KNOW YOUR STEROID

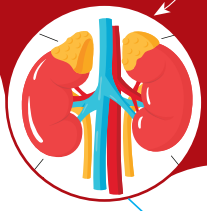
Steroids used against infectious diseases like COVID and autoimmune disorders are known as corticosteroids. Unlike anabolid steroids, used by athletes to improve muscle mass and performance, corticosteroids primarily work by assuaging the immune system

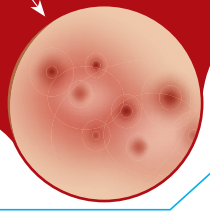
HOW THEY WORK

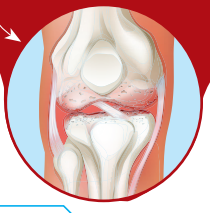
Corticosteroids are a synthetic version of hormones produced by adrenal glands found above the kidneys

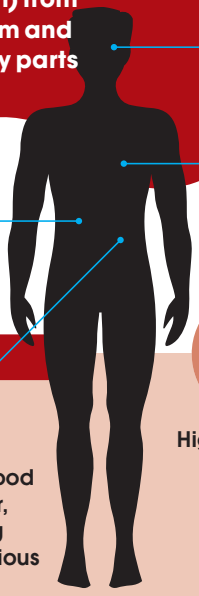
When taken in doses higher than the amount produced by the body, corticosteroids prevent inflammation (a process in which immune system produces white blood cells to eliminate contagion) from assuming severe form and thereby protect body parts

Steroids also reduce the activity of the immune system, the body's natural defence against infection. This can help treat auto-immune conditions like rheumatoid arthritis that are caused by the immune system mistakenly attacking the body









SIDE EFFECTS OF STEROID TABLETS



Indigestion or heartburn



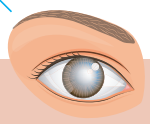
Changes in mood and behaviour, such as feeling irritable or anxious



High blood sugar or diabetes



High blood pressure



Eye conditions, such as glaucoma and cataracts

Increased appetite, which could lead to weight gain





Insomnia



Increased risk of infections—especially chickenpox, shingles and measles



Weakening of the bones



Cushing's syndrome, which can cause symptoms such as thin skin that bruises easily

Mental health problems, such as depression or suicidal thoughts



REMEMBER

Never self-medicate steroids. If taken early, it might weaken the immune system and aggravate the disease.

If you forget a dose, take it as soon as you remember. If it's almost time for your next dose, skip the one you missed.

Taking too many steroid tablets over a long period increases the severity and chances of side effects.

Never abruptly stop taking steroids as the adrenal glands need time to resume their normal function

Source: National Health Service, UK and MD Anderson Cancer Centre, US

result in a range of side effects, from indigestion and sleep disorders to serious complications like diabetes and damaged liver function. Since corticosteroids work by suppressing the immune system, they can also make one susceptible to a range of other avoidable infections, especially shingles, chickenpox and measles. Any abrupt discontinuation of the drug causes sudden steroid deficiency in the body and can result in life-threatening conditions like sudden drop in blood pressure or blood glucose level. Yet, in Ajit's case, the steroids were stopped abruptly, rather than being tapered off.

A fortnight after recovering, Ajit realised that he has developed abnormal liver function. Blood tests showed his condition has reached the stage of liver cirrhosis. He now goes to a gastroenterologist for treatment who fears that the complications might have happened because of overdose of steroids.

If Ajit's treatment regimen sounds familiar, you are likely among the thousands of COVID-19 patients in India who relied on steroids—either with a doctor's prescription or through self-medication—even though your medical condition did not necessitate it. And by doing so you have not only risked your chances of recovery but have also jeopardised your health further.

Unofficial estimates show the sale of corticosteroid drugs increased manifold during the second wave of the pandemic. Little analysis is available to understand the extent to which the medicine was misused during the period and how many people might have suffered from its side-effects.

The scale of the problem, however, can be gauged from the sudden surge in the cases of mucormycosis, a rare but aggressive fungal infection that affects the nose, eye and sometimes the brain and results in the death of 50 per cent of the patients (see 'Caught unawares', *Down To Earth*, June 16-30, 2021). Current trends show the surge is higher in those with pre-existing diabetes, those on systemic corticosteroids and in people with COVID-19 and those recovering from it. Several doctors and researchers therefore consider mucormycosis as an indicator of steroid abuse because the condition is triggered by high blood sugar level, a common side effect of steroids.



Most doctors, particularly in rural areas and tier II cities, were not aware of the government's COVID-19 treatment protocol. Instead, many relied on their experiences

S P Kalantri
Medical superintendent at the Mahatma Gandhi Institute of Medical Sciences, Sevagram, Maharashtra

India has recorded over 50,000 cases of mucormycosis within months after the second wave of the pandemic that peaked in April and May this year, confirms a Union health ministry official on condition of anonymity. "Earlier, mucormycosis was seen in patients with uncontrolled diabetes, but the incidence was low. However, due to COVID-19 treatment, there is a significant increase in the number of cases. Several parts of the country are reporting the increase," Randeep Guleria, director of the All India Institute of Medical Sciences and a member of the country's COVID task force, said in a media briefing mid-May.

Guleria is among the several doctors who towards the later part of the second wave urged healthcare specialists to stop unmindful prescription of steroids, saying that it is leading to deranged sugar levels in otherwise healthy people and that they are now returning to hospitals with dangerous fungal infections. The government too started amplifying the message at almost every press conference and awareness programme. Following the surge of COVID-19 associated mucormycosis, the Union government on May 20 this year issued a directive asking states to declare the spread of the fungal infection as an epidemic.

Steroid abuse during the second wave ended up unnecessarily adding pressure to the already stressed healthcare system. Lancelot Pinto, pulmonologist at Mumbai's PD Hinduja Hospital, says, "Not only were we treating COVID-19 patients, we were also burdened with patients, often from tier II cities, who were suffering from ailments triggered by the misuse of steroids."

Double-edged sword

Administering of steroids is a risk-management exercise requiring close monitoring of patients, which doctors ignored during the pandemic to save lives or to keep people out of hospitals

SUCH A furore over the misuse of corticosteroids and the resulting side effects was witnessed for the first time in history, despite the fact that this versatile class of medicines has been in use for nearly 70 years now.

Synthetic steroids first became known in 1939 when testosterone was successfully synthesised in Germany. They were initially used to treat depression, and also widely administered to German soldiers during the World War II. A few years later, chemists Edward Kendall and Philip Hench from the US and Tadeusz Reichstein from Poland described the hormones produced by adrenal glands as cortisols, and received the Nobel Prize in Medicine for the discovery in 1950. Their understanding led to the synthesis of first corticosteroid, cortisone, which was used to manage rheumatoid arthritis in 1948 at Mayo Clinic, US.

Over the years, corticosteroids have become an integral part of the medical system and have particularly been helpful in managing auto-immune disorders, a condition in which the body's immune system mistakenly attacks its own healthy tissues. In such conditions, the immune system triggers inflammation even in the absence of any invaders and causes damages to healthy tissues, such as those in the joints (rheumatoid arthritis) or in the skin (psoriasis). Corticosteroids help shut down these inflammatory processes and alleviate the condition.

Pulmonologists also prescribe steroids for short duration to contain asthma attacks and long-term routines to treat intestinal lung diseases, allergies, hypersensitive immunity disorders, and the exacerbation of chronic obstructive pulmonary disease. They can be effective in treating high-altitude



pulmonary edema, a life-threatening condition caused by hypoxia in the mountains even without any infection.

Cancer treatment also includes a wide range of uses for steroids. Often, they are a part of the main treatment, especially with lymphoma (cancer of the lymphatic system, body's disease-fighting network) and multiple myeloma (cancer of plasma cells). They aid in the management of nausea and vomiting, common side effects of chemotherapy, and are also used before CT scans to reduce the patient's chances of allergic reaction from the contrast dye used during the imaging. "Additionally, steroids help ease cancer-related fatigue and relieve pain, improving the overall quality of life," says Nikita Mehra, associate professor of medical oncology at the Adyar Cancer Institute in Chennai.

Since the side effects of corticosteroids can be as serious as the ailments they are intended to treat, doctors have always prescribed them keeping in mind the delicate balance between benefit and risk.

BETWEEN BENEFIT AND RISK

The seriousness of the side effects depends on the type of corticosteroid, potency of the dose and the duration and method of administration. For instance, they tend to cause fewer complications when applied topically in case of skin ailments or inhaled for a shorter duration for asthma. In contrast, oral doses of steroids and injected steroids are likely to cause serious side effects. They can lead to depression, insomnia, increased appetite, mood swings and weight gain even when taken for less than three months.



Long-term use of fairness creams with steroids can lead to thinning of the skin, which is a permanent damage. The skin of some of the patients becomes sensitive to all sorts of infections

Ananta Khurana,
Faculty member, dermatology department, Ram Manohar Lohia Hospital, Delhi

So doctors usually observe extreme caution when prescribing the dosage and duration of steroid medication. Alongside, care is taken to prevent, minimise and treat the complications. "There is no fixed response or dosing for steroids. We monitor and alter. If we see that steroids are not working, we never increase the dose; we just stop it," says Able Lawrence, rheumatologist and immunologist at Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow. While prescribing, doctors also have to be careful about the circadian rhythm—the sleep cycle. The immune system is not much alert while the body is at rest. So, it is best to take steroids just before the body is to wake up and the immune system is going to be active again, he says, adding that steroids are most effective in small doses.

Since steroids disturb glucose metabolism and suppress the immune system, doctors closely monitor blood sugar levels and try to rule out the risks of other infections. Several doctors, particularly oncologists, prescribe antifungal medications along with steroids. "If the steroids trigger a fungal infection in the lungs of a cancer patient, the chances of survival become really low," says Mehra.

READJUSTED FOR COVID

To ensure this delicate balance between benefit and risk during the fight against the COVID-19 pandemic, WHO in its September 2020 guidelines made two recommendations. It said steroids should be used for the



treatment of patients with critical and severe COVID-19, and that they should not be used for non-severe patients. It qualified critical patients as those suffering from acute respiratory distress syndrome, sepsis, septic shock or other conditions that would normally require life-sustaining mechanisms like ventilators. Severe patients, on the other hand, are those with oxygen saturation levels below 90 per cent in room air, a respiratory rate of more than 30 breaths per minute or those who show signs of severe respiratory distress. The guidelines highlight that steroids are among a relatively small number of interventions available to COVID-19 patients that can potentially reduce health inequities during the pandemic, as most of the other measures are expensive and often in short supply.

WHO's recommendations are based on the findings of eight randomised trials on 7,184 participants across several countries for 28 days. The trials found that when treated without steroids, the mortality rate in critical patients was 415 deaths per 1,000 patients as opposed to 328 deaths when treated with steroids. In the case of severe patients, the mortality rate gets reduced from 334 deaths per 1,000 without steroids to 267 deaths with steroids. But the trend gets reversed in non-severe patients. The mortality rate is 176 per 1,000 non-severe patients when they are treated without steroids but the rate increases to 215 in the group treated with steroids. This could be simply because of the fact that the non-severe patients did not derive any benefit from steroids, which may have instead done them harm, the trials concluded.

The WHO guidelines are broadly mirrored in the Union health ministry's guidelines, the "Clinical Management Protocol for COVID-19 (in adults)", updated on May 24, 2021. They also suggest low doses of steroids in mild cases only if the symptoms persist beyond seven days.

Despite these facts, how did corticosteroids become the off-label home remedy during the second wave?

HISTORY OF ABUSE

Steroid abuse has been rampant in case of topical ointments and for eye conditions

WHILE COVID-19 has put the spotlight on the abuse of corticosteroids, an analysis by *Down To Earth* shows that such abuse is not uncommon in the country. The bulk of the research on steroid abuse, however, revolves around its topical use to cure skin diseases as these medicines are easily available, sometimes even without a prescription. The illegal use of steroids is common in fairness creams and beauty products because of their skin whitening properties. "Long-term use of fairness creams with steroids can lead to thinning of the skin, which is a permanent damage. The skin of some of the patients becomes sensitive to all sorts of infections in the future," says Ananta Khurana, faculty member in the dermatology department of Ram Manohar Lohia Hospital in Delhi. In certain extreme cases, quacks administer intravenous steroids for skin infections too. "This impacts the general immunity," she says. Dehradun-based dermatologist Molly Thomas says the abuse is particularly high in rural India. In 2016, she, along with five other researchers, studied 723 patients in rural Uttarakhand and found that 30 per cent of them had unknowingly misused steroids. The researchers recovered 70 brands of harmful steroid creams from the patients. Advice from pharmacists and local healers account for up to 78 per cent of the steroid misuse, writes Thomas in the May 30, 2020 issue of *BMJ Open*.

Steroid abuse is also common in cases of eye ailments. "Its overuse in treating ophthalmic problems often leads to glaucoma-induced blindness in children. These drugs, often sold over-the-counter as they are not properly labelled as steroids, give temporary relief but cause irreparable damage," says Harbans Lal, vice president, All India Ophthalmological Society. He explains that people commonly use steroids to treat conjunctivitis, which often deteriorates the condition.

Rajetha Damisetty, head of the steroid abuse task force of the Indian Association of Dermatologists and Venereologists and Leprologists, blames the government for the mess. "After much delay, the government in 2018 brought 14 types of topical steroids under the Schedule H category [under the Drugs and Cosmetics Rules, 1945], which means they can be sold only with a prescription. Still, a large number of patients suffer from diseases triggered by topical steroids as they can still be purchased without a prescription," she says. The association's website shows one in every four skin patients suffers from steroid abuse. Khurana says some of the responsibility should also be borne by the manufacturers. "In India, often when a skin cream is banned because of illegal steroid use, manufacturers re-launch the cream under a new name," he says. "While labels do mention scientific name of the steroid, it is a tall order to expect lay consumers to understand the implications."

What protocol?

Poor dissemination and discrepancies in Union and state governments' versions have made doctors lose faith in COVID-19 treatment protocol, leading to steroid misuse across the country

ONE COMMON reason for the flagrant misuse of steroids during the second wave of the pandemic was the fear of the contagion, further stoked by the lack of immediate or assured access to healthcare. So in many cases, a prescription given to one family member also became the prescription for his or her immediate family, extended family and even friend circles. There were several prescriptions widely circulated over the social media and messaging applications. Despite being a Schedule H drug under the Drugs and Cosmetics Rules, 1945, which prohibits over-the-counter purchase of several corticosteroids, including those crucial in the fight against COVID-19, without the prescription of a qualified doctor, patients recount that obtaining the drug over the phone was not difficult.

The situation worsened as most homebound COVID-19 patients on steroid therapy did not get blood tests done to monitor their blood sugar level or markers of inflammation either due to lack of knowledge or due to lack of access to pathological laboratories, which were already overwhelmed with COVID-19 diagnosis.

As patients flooded hospitals, physicians too reached for any therapy in a desperate bid to save lives. "In the intense second wave, when finding a bed was a luxury, mild use of steroids on moderate patients whose oxygen saturation levels had depleted ensured that their condition did not turn severe," says Ujjwal Parakh, a senior pulmonologist at Delhi-based Sir Ganga Ram Hospital. This ensured that moderate patients did not require hospital beds, which were already running short to accommodate severe patients," he adds.

To avert a chaos like this, the Union health ministry had put in place the clinical management protocol for COVID-19 since the beginning of the pandemic. But as its engagement remained limited to updating or revising the guidelines and releasing them at press conferences in the national capital, the guidelines rarely



reached doctors working overtime to treat COVID-19 patients.

LEFT IN THE LURCH

"During the pandemic, the Union health ministry did update and revise its COVID-19 clinical management protocol to accommodate latest scientific understanding related to treatment. But most doctors, particularly in rural areas and even in tier II cities, were not aware of them. So, many relied on their experiences," recalls S P Kalantri, medical superintendent at Mahatma Gandhi Institute of Medical Sciences in Maharashtra's Sevagram. "As such in India, the tendency to prescribe or consume evidence-based medicine is low. This tendency became accentuated during the pandemic and created a situation for rampant steroid misuse," Kalantri adds.



The lack of adherence to the protocol was also because of a general sense of confusion and distrust about it. Consider this. The Union health ministry did not update the protocols for nearly six months after the first wave. And then during the peak of the second wave it revised the guidelines twice—first on May 17 and on May 24. The discrepancy between the protocols set by the Union health ministry and those by state governments further added to the confusion. For example, while revising the treatment protocols on May 24, the Union health ministry removed ivermectin, an anti-parasite medication, from its recommended list of drugs. However, Maharashtra continued to recommend it for treatment while Goa and Assam recommended it as a preventive medicine.

Jacob John, an infectious diseases expert at the Christian Medical College in Vellore, Tamil Nadu, cites another reason for the misuse of corticosteroids during the second wave. He says India's COVID-19 guidelines are too prescriptive. "They have just one treatment protocol for each one of three patient categories (mild, moderate and severe). But what would a doctor do if the prescribed treatment did not work with his patients?" he asks. A sensible step would have been to recommend multiple treatment options, giving doctors the flexibility to choose the appropriate course of action according to the patient's specific condition and response.

Such a flexible template exists in almost all developed countries. The UK guidelines, for example, provide three treatment options for each of the patient categories: recommended, conditional recommended and consensus recom-

mended. Recommended treatment includes interventions backed by solid research evidence. Conditional recommendation is given to interventions that have greater advantages than disadvantages, based on partial research available so far. A consensus recommendation is given to interventions that the panel of doctors thinks is important even though enough research or evidence does not exist for it to be either accepted or rejected.

The other global trend is that the recommendations are backed by clinical evidence. In countries like the UK, all treatment protocols provide links to research papers based on which the guideline has been drafted. "This makes the doctors more confident about their recommendations," says John. No such clinical evidence finds a mention in India's COVID-19 treatment protocol.

The WHO guidelines also have a section titled "practicalities/implementation considerations" that discuss real-life problems doctors are likely to face and offers solution. For example, while recommending that steroids should be administered after seven days of symptoms, the section acknowledges the difficulty doctors are likely to face in ascertaining the same. So, it says "it was preferable to err on the side of administering corticosteroids when treating patients with severe or critical COVID-19 (even if within seven days of the onset of symptoms) and to err on the side of not giving corticosteroids when treating patients with non-severe disease".

WHERE'S SCHEDULE H?

What also appears to have compounded the problem of steroid misuse is the cheap and easy access to corticosteroids.

Though COVID-19 has put the spotlight on cortisteroids with India reporting the most alarming cases of widespread steroid abuse during the second wave, corticosteroid abuse has been a long-standing problem in the country. A review of available research papers by *Down To Earth* shows that corticosteroids meant for topical application to cure skin ailments are highly abused (see "History of abuse', on *p*35). Though little study is available to understand the extent of misuse of orally consumed corticosteroids, vital in the treatment of infectious and a range of other life-threatening diseases, its possibility cannot be ruled out as studies elsewhere suggest a growing trend of reckless use of the medicine.



India's COVID-19 guidelines have prescriptive treatment protocols for mild, severe and critical categories of patients. What would a doctor do if the prescribed treatment did not work?

Jacob John
Infectious diseases expert at Christian Medical College, Vellore, Tamil Nadu

The consumption of prednisone, a kind of steroid used to treat acute respiratory ailments nearly doubled from 2007 to 2016 in the US, suggests a study published in *PLOS Medicine* in March 2020. The study, which looked at over 9 million patients, found that almost 12 per cent of them were prescribed systemic steroids even though existing evidence and guidelines do not support their use. A little more than 46 per cent of the patients received their steroids intravenously, which is known to cause stronger side effects, and almost 7 per cent received both oral and intravenous doses.

Could this also be the trend in India? Obtaining a Schedule H drug just over a phone call or by showing a text message on the mobile phone might have helped save some lives during the pandemic, but they could also be the reason behind many deaths. Should the practice be left unchecked? Moreover, is this a practice that began during the pandemic or has been there before? All these questions need to be resolved as the government prepares for the imminent third wave.

The National Pharmaceutical Authority of India has already asked the manufacturers of two types of steroids, dexamethasone and methylprednisolone, to scale up production. Its letter says the country is expected to require 3.3 million tablets of dexamethasone and 0.1 million tablets of methylprednisolone by August 15. Until the government learns from the mistakes made during the second wave, the risks of steroids may once again outweigh the benefits. DTE

@Banjotkaur

"USING SOCIAL MEDIA, A POWERFUL TOOL TO BRING POSITIVE BEHAVIOUR CHANGE IN RURAL KARNATAKA"



Social Media (SM) with appropriate strategies is an effective tool to bring sustainable behaviour changes in the lives of people. Approximately 80% of India's SM users are from Urban and the rest 20% are from Rural. Understanding the potential to increase the reach and coverage, Rural Drinking Water & Sanitation Department, Government of Karnataka is promoting awareness through IEC-HRD (Implementation Support Activities) contents of Swachha Bharat Mission (Grameen) and Jal Jeevan Mission in major social media channels. Support activities with a proper mix of traditional communication methods and SM, are quintessential in educating and bringing behaviour changes in the rural audience and achieve sustainable water and sanitation practices.

With deeper understanding of its audience, RDWSD has created a subject based year round theme calendar. Subjects are focused on SBM (G) and JJM. Toilets (construction-usage-maintenance), Solid-Liquid Waste Management, Water Conservation, Water Quality Monitoring & Surveillance Program, Menstrual Hygiene Management, etc. are few examples. It also communicates about experiences of beneficiaries about the schemes and the impact on their lifestyle.



RDWSD actively communicates through Facebook, YouTube, Twitter, Instagram and Slideshare channels, in various formats like infographics, success stories, department updates, myths & facts, theme based video stories and also emotional connect on important national and international calendar days. In addition, its official website https://swachhamevajayate.org/ also contains detailed information on water & sanitation, schemes, blogs, guidelines, job opportunities and various other important details.

Each channel is essential in reaching different sections of people. Facebook & YouTube reach rural masses, Instagram connects with youngsters, and Twitter is used by influencers. It also has a SlideShare account to store all designed educative material for easy access to trainings and development programs.



RDWSD has also created Facebook and Twitter pages for each district which assists to connect between department and respective district audience. District page showcases its works at the grass-root level and motivates people by spreading awareness on water and sanitation.

RDWSD uses various tactics to increase its reach like cross promotion on channels to consolidate followers, promoting content to website subscribers through emails, posters with SM channel QR codes across all panchayats, several Whatsapp & Telegram groups to mobilise its workforce, promoting on various similar interest Facebook groups, using alternative SM tools (Facebook Stories, Instagram Stories, Twitter Fleets & YouTube Community), Google tagging the respective district's work and attracting video views using catchy YouTube thumbnails. It also promotes internally through notice board and encourages its employees to share related stories which will be utilised in future communications.



The role of community participation is very important in making a scheme successful and SM supports this vision by playing a vital role in educating & creating awareness amongst the rural audience. On the other hand, rural audience have an excellent opportunity to voice out their opinions and make their surroundings better. People have the opportunity to support this initiative and empower themselves to make this world a better place through proper water and sanitation practices.



TO KNOW MORE SCAN THESE QR CODES

Har Ghar Jal
Jal Jeevan Mission

JALOTSAVA
MANE MANEGE GANGE

SWACHHA MEVA JAYATE

SWACHHA SANKEERNA

Clean India
A Step Towards Cleanliness

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parihara
9480985555

OUT IN THE OPEN

Contrary to the government's claim of India being open defecation free, 15 per cent Indians still go out to relieve themselves, says a WHO-UNICEF report

SHIVANGI AGARWAL



ON OCTOBER 2, 2019, Prime Minister Narendra Modi declared India open defecation-free (ODF). A long-pursued target of successive governments, the milestone was celebrated with much fanfare on Mahatma Gandhi's 150th birth anniversary. With India's achievement, the world made great strides in meeting the sixth Sustainable Development Goal (SDG-6) that "ensures availability and sustainable management of water and sanitation for all by 2030". Before 2014, the country was responsible for 60 per cent of the world's open defecation burden with over 550 million people not having access to toilets, as per the Union Ministry of Jal Shakti.

However, a report titled *Progress on Household Drinking Water, Sanitation and Hygiene 2000-2020* by the World Health Organization (WHO) and the United Nations Children's International Emergency Fund (UNICEF) released on July 1, 2021, raises doubts about India's claim. The Joint Monitoring Programme (JMP) report assesses the progress the world has made on household drinking water, sanitation and hygiene between 2000 and 2020 to measure the progress made towards achieving SDG-6. It acknowledges that India is responsible for the largest drop in open defecation since 2015, in terms of absolute numbers. Open defecation had dropped by 16 per cent points over the 10 years since 2000. The pace of reduction picked up after 2016, with open defecation dropping by 14 per cent points

THE REPORT DID NOT INVOLVE ANY FIELD SURVEY OR DATA VALIDATION GLOBALLY. IT IS BASED ON THE DATA OF NATIONAL GOVERNMENT SURVEYS, SUCH AS THOSE OF THE NATIONAL SAMPLE SURVEY OFFICE, THE NATIONAL FAMILY HEALTH SURVEY AND THE CENSUS OF INDIA



The National Annual Rural Sanitation Survey, round three, 2019-20, says 85 per cent of the rural population uses safe and functional toilets

PHOTOGRAPH: PRIYA RANJAN SAHU

in only five years, notes the report.

An interactive dashboard prepared as part of the JMP report shows that in 2020, about 15 per cent of the total population in India defecated in the open. A breakup of this figure suggests that contrary to the government claims, over 22 per cent rural population and 1 per cent urban dwellers in the country could still be continuing to defecate in the open. In fact, for 2019, when the government declared the country ODF, the JMP dashboard shows that some 18 per cent people in the country defecated in the open: 26 per cent were in rural areas and over 2 per cent in urban areas. Does this mean the country never achieved the much-publicised ODF status?

IT'S BOTH YES AND NO

"The JMP report did not involve any field survey or data validation globally," says a UNICEF official who does not wish to be named. Its dashboard just offers a statistical analysis to produce estimates from 2000 through 2020 by using past 20 years of sanitation-related data collected by the Indian government, says the official.

Rick Johnston, technical officer, JMP, Department for Environment, Climate Change and Health, WHO, Switzerland, says: "We had access to 41 data sources from India. These were household surveys, administrative data and the censuses of 1991, 2001, and 2011." The 41 sources based on which JMP prepared the report included the Jal Jeevan Mission, Central Ground Water Board, Quality Council of India, National Sample Survey Office, Census of India, National Rural Drinking Water Programme, National Service Scheme, Central Pollution Control Board, Demographic Health Survey and others.

As much as one may wish to discount JMP's figures as a statistical glitch, data from some government sources also raise doubts about India's ODF claim. One such is the National Annual Rural Sanitation Survey, 2019-2020, which says 85 per cent of the rural population used safe and functional toilets and that 0.8 per cent of the population in rural areas had no toilets and practised open defecation; the figure was 6.8 per cent in 2018-2019; and 23 per cent in 2017-2018.

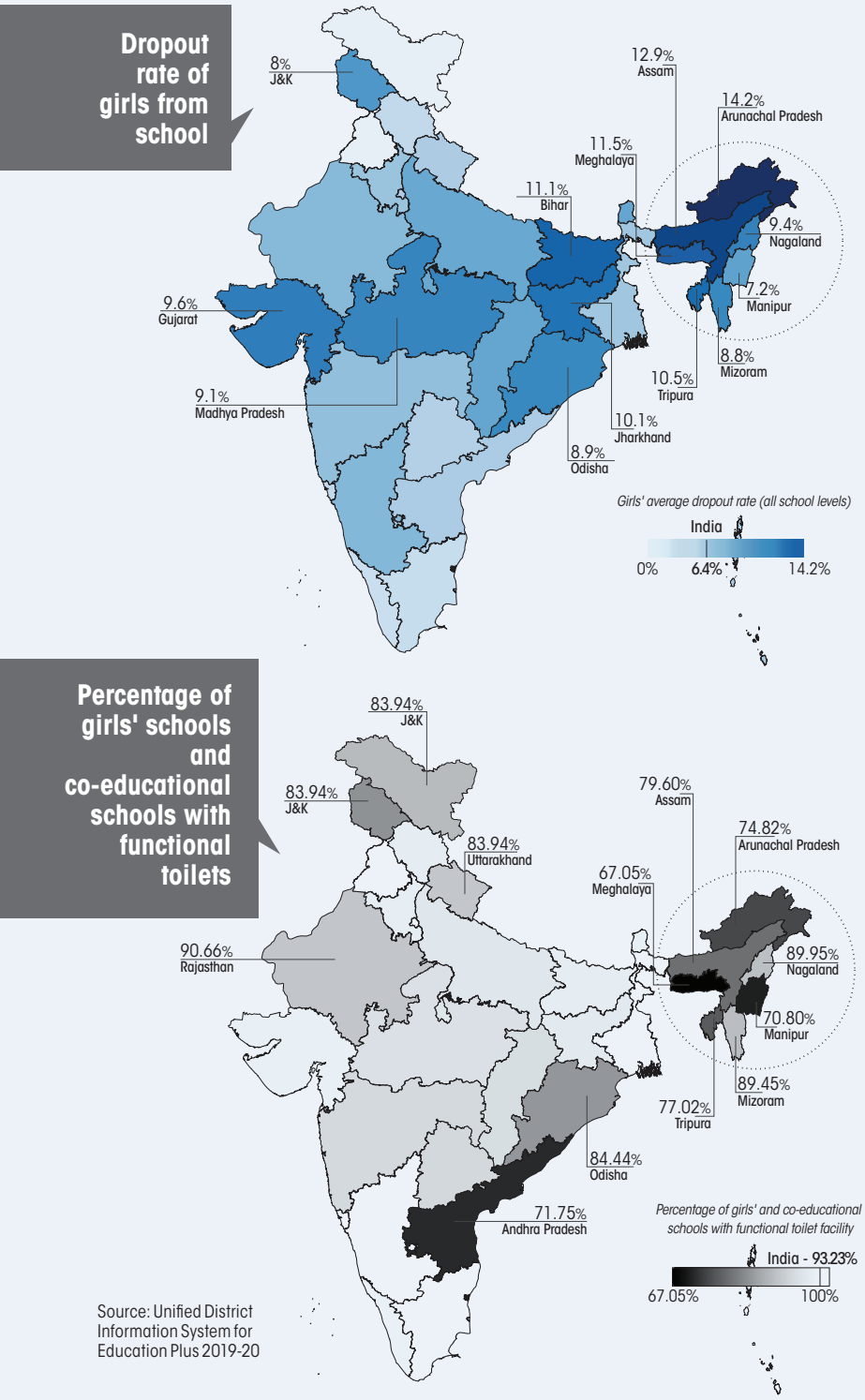
The UNICEF official says experience on the ground shows open defecation continues in the country despite the government's claim that it has provided a toilet to every household.

WHY THE RELUCTANCE

The people's hesitancy to use toilets, which had over and again derailed India's efforts to eliminate open defecation, no longer appears to be prevalent following the massive awareness programmes carried out under the Swachh Bharat Mission (SBM). However, there is a possibility that at places, people are not using

CLEAR LINK

In all northeastern states, the dropout rate of girls from schools is higher than the national average of 6.4 per cent, while the percentage of girls'/co-educational schools with functional toilets is below the national average of 93.23 per cent



Source: Unified District Information System for Education Plus 2019-20

toilets because of faulty design or due to lack of adequate water.

Delhi-based non-profit Centre for Science and Environment recently conducted a questionnaire-based analysis of four districts in Rajasthan to understand toilet usage in the villages. These districts—Sikar, Dhaulpur, Dausa and Jaipur—were declared ODF between October 2017 and January 2018. In the analysis, district officials acknowledged that in Dausa and Dhaulpur, several toilets were lying defunct since they did not have water connection. In Sikar, single-pit latrines have filled up. Though twin pit toilets were recommended under SBM, the district has 0.43 million single-pit toilets. The situation is particularly alarming in Jaipur where government officials say almost all the toilets have their pits or tanks filled up. Have the residents in these areas now gone back to the practice of defecating in the open?

The JMP report acknowledges that within India, open defecation has been "highly variable" regionally. Though it does not include community or shared toilets, such discrepancy can also be seen in the *Unified District Information System for Education Plus 2019-20*, a report by Union government's Department of School Education and Literacy. Analysis of the data shows several states that have performed well in providing toilets to households, do not have community toilets in schools. In northeastern states, for example, the lack of toilets in schools appears to be a reason for dropout of girl students (see 'Clear link').

It is time the government started verifying toilets again—this time to check their functionality. DTE

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(With inputs from Pulaha Roy)

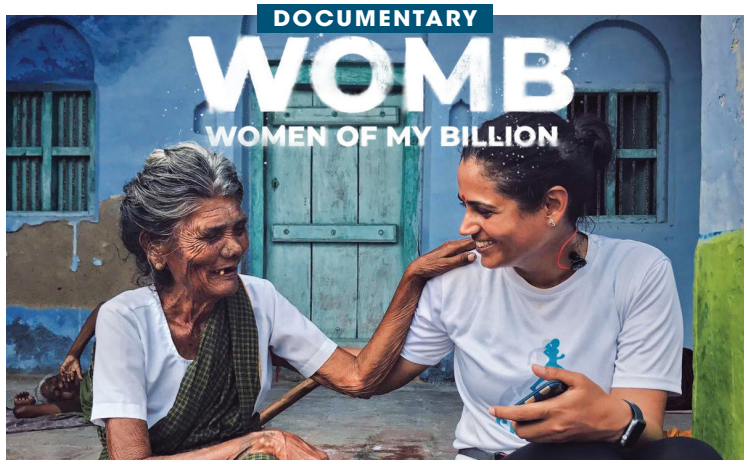
Palette

WHAT'S INSIDE

Does India need harsh measures to curb population growth? P44 / Uttarakhand students show how to use aeroponics at home P51 / Dilip Kumar's roles projected woes of a nascent India P54

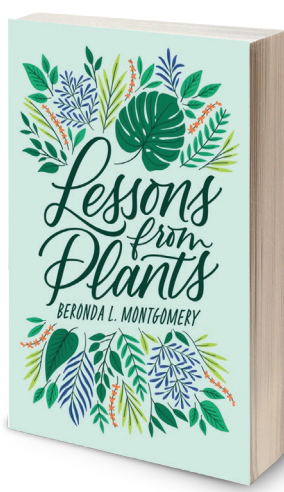
RECOMMENDATIONS

DOCUMENTARY

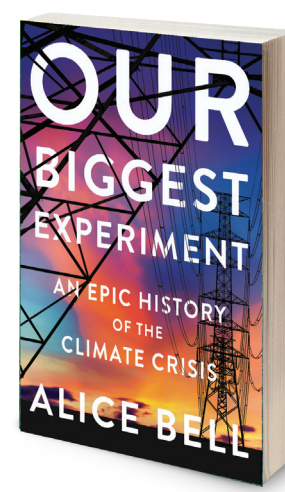


From Kanyakumari to Kashmir, all corners of India are filled with women who battle every day against social and political forces that seek to suppress their voices. Filmmaker Ajitesh Sharma's latest documentary, *WOMB-Women of My Billion*, introduces many such voices through the eyes of a young woman, Srishti Bakshi, as she walks 4,000 km from the southern tip of the country all the way to the north in 240 days. *WOMB* will officially open the Indian Film Festival of Melbourne that is set to take place on August 12-20, 2021.

BOOKS



Humankind understands now more than ever how important plants are for the survival of the Earth and all its inhabitants. But it is not just their ability to absorb carbon dioxide and give off life-saving oxygen that makes them useful to us. In *Lessons from Plants*, Michigan State University professor Beronda L Montgomery lists a number of things we can learn from these organisms: how to adapt to the changing environment; or to respond to ecological competition; or even survive in extreme conditions designed to make or break you.



As early as 1856, scientist and women's rights campaigner Eunice Newton Foote tried to warn people about the dangers of pumping greenhouse gases into the atmosphere; but no one paid much attention. Foote is not the only one; throughout history, there have been several scientists whose theories and discoveries have helped shape the field of climate change science as we know today. Climate activist and writer Alice Bell shares their stories and their solutions in *Our Biggest Experiment: A History of the Climate Crisis*.

GOVERNANCE OR BIOPOLITICS?

Ever since Prime Minister Narendra Modi used the phrase "population explosion" during his Independence Day speech in 2019, the issue has been discussed in national politics. Recently, two Bharatiya Janata Party-ruled states—Assam and Uttar Pradesh—proposed population control laws. While the Uttar Pradesh Population (Control, Stabilisation and Welfare) Bill, 2021, was open for public suggestions till July 19, the Assam Cabinet has announced the implementation of a two-child policy. Under both, people with more than two children will be denied subsidies or benefits under public schemes, including government jobs. In a country whose population policy does not keep a tab on the number of people, and where awareness programmes and incentives have worked to attain near replacement-level fertility rate, are such coercive steps needed? Is this the beginning of biopolitics in India? **SHAGUN KAPIL** talks to law and policy experts:



"Wrong assumptions"

FAIZAN MUSTAFA
VICE-CHANCELLOR, NALSAR UNIVERSITY OF LAW, HYDERABAD

The proposed Uttar Pradesh Bill on two-child norms is based on two assumptions: there is population explosion in the state; and the dated Malthusian theory of "too many people, too few resources". The Uttar Pradesh Law Commission that drafted the Bill without being asked either by the state government or by the constitutional courts, seems to be ignorant of current developments in demographic studies. In place of permanent sterilisation, spacing and informed consent have emerged as far more effective methods of population control. In any case, as per 2016-17 data, we should be ashamed to have 1:52 male-female ratio in sterilisation.

The proposed law would lead to more abortions, leading to adverse sex ratio at birth. It would lead to more divorces or abandonment of women and even children so that parents remain eligible to contest elections. Moreover, non-inclusion of assembly and parliamentary elections makes the

KERALA AND TAMIL NADU HAVE EXPERIENCED SIGNIFICANT REDUCTION IN FERTILITY RATES WITHOUT ANY COERCIVE METHODS

classification suspect and not based on intelligible differentia with a rational object to achieve, and thus is incompatible with Article 14 of the Constitution.

Today the experts are convinced that carrot-and-stick policies do not help in controlling population explosion as incentives/disincentives do not have much relevance for the lower strata of population. Due to our regressive and patriarchal ideology, we do not recognise our women as citizens in their own right with their distinctive individuality but treat them as just passive reproductive agents. The Bill will have the effect of denying women their right to personal liberty under Article 21 of the Constitution. Uttar Pradesh has already undermined their agency by denying them the right to choose their spouses through love *jihad* laws and this Bill now tries to control even their reproductive choices.

The reference in Section 8 of the Bill to "whoever procreates" clearly applies only on women. Are we not going to create obstacles in the way of our women in getting elected to the local bodies, as there is reservation for them in such bodies? They would no more be able to compete for public employments as well. Accordingly the Bill is in the teeth of the National Population Policy, 2000 that was approved by the National Democratic Alliance government led by the late Atal Bihari Vajpai and that instead of coercive methods focused on much more relevant socio-cultural factors such as age at marriage, age at birth, girl education, maternal and child health and above all the voluntary and informed consent. Being signatory to international covenants like the International Covenant on Civil and Political Rights (ICCPR), India has to abide by the international norms on population control. The UN's Human Rights Committee has categorically mandated that state parties to ICCPR cannot adopt policies that are compulsory, coercive or discriminatory. Even the Modi government in an affidavit filed in Supreme Court as late as December 2020 had admitted that "the international experience shows that any coercion to have certain number of children is counter-productive and leads to demographic distortions". Clearly the Yogi government's move has some electoral dividends in mind rather than the population control. In any case, Uttar Pradesh, too, has shown signs of decline in the fertility rates and the 2021-22 Census may show it reaching desired replacement rate.

"Coercion doesn't work"

POONAM MUTTREJA
EXECUTIVE DIRECTOR, POPULATION FOUNDATION OF INDIA, DELHI

The draft Bill proposed by the Uttar Pradesh Law Commission on July 7, 2021, compels couples to limit their families through a series of incentives and disincentives. However, there is no evidence currently available that shows that coercive policies have been effective in reducing fertility. Two-child policies are known to disproportionately impact the most vulnerable, particularly women and girls. The proposed Bill may have disastrous consequences and lead to an increase in gender inequality, sex-selective elimination, unsafe abortions and malnutrition. A five-state study by Nirmala Buch, a former senior Indian Administrative Service officer, shows that coercive policies have not been effective in fertility reduction. The study instead reveals that in states that adopted a two-child policy, there was a rise in sex-selective and unsafe abortions; men divorced their wives to run for local body elections; and, families gave up children for adoption to avoid disqualification.

Instead, our focus must be on safeguarding women and girls' reproductive health. Smaller families can be achieved



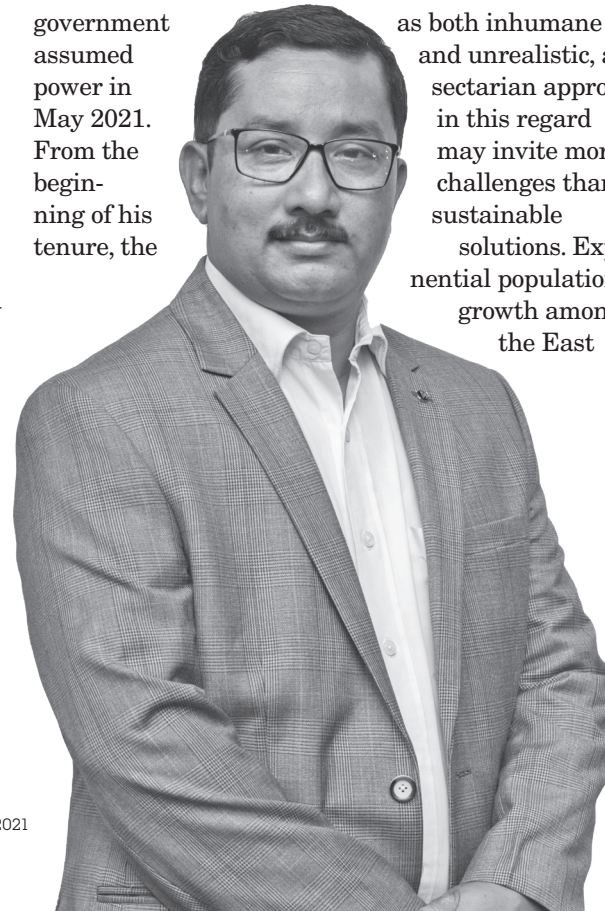
through ensuring gender equality, empowering women, improving education, economic development and access to family planning services. Sri Lanka brought down its fertility rate via greater investments in girl-child education and a robust family planning programme. Bangladesh did so by expanding the basket of contraceptive choices available to men and women. In India, Kerala and Tamil Nadu have experienced significant reduction in fertility rates without any coercive methods. Kerala was able to bring the total fertility rate (TFR, or average number of children per couple) down to 1.6 by investing in girl-child education, employment opportunities, women's empowerment and health system. Population explosion is not a problem facing India, or more specifically Uttar Pradesh. They are on their way to population stabilisation. Instead, we would do better by increasing access to voluntary family planning and reproductive health services, promoting comprehensive sexuality education for adolescents, addressing violence against women and girls, thereby improving the health and wellbeing of women, men and young people.

TFR in Assam is 1.9, which is less than the national average of 2.2. Instead of stringent population control measures, Assam should focus on delaying marriage age, improving spacing between children, and ensuring girls stay in schools. Approximately 32 per cent of women in Assam were married before the age of 18 years.

"A misguided approach?"

AKHIL RANJAN DUTTA
PROFESSOR AND HEAD OF POLITICAL SCIENCE, GAUHATI UNIVERSITY, ASSAM

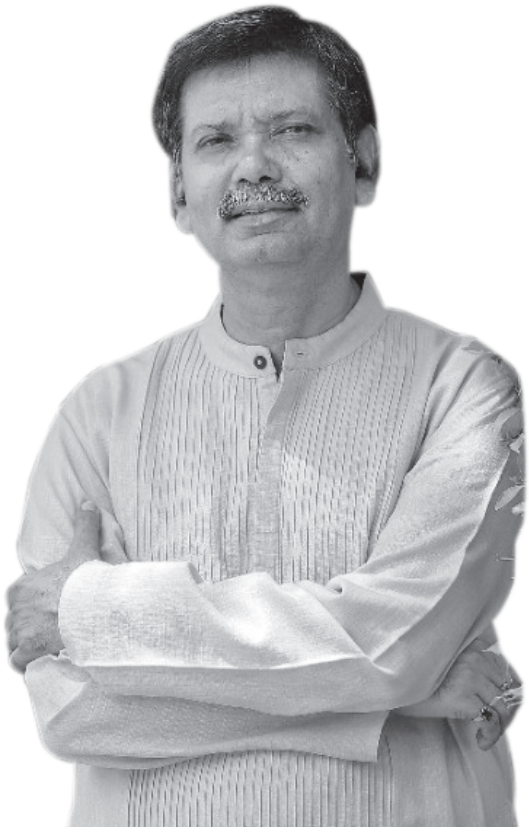
Debates on population control gained momentum in the state of Assam after the Himanta Biswa Sarma-led government assumed power in May 2021. From the beginning of his tenure, the chief minister has been asserting that his government stands for a stringent population policy and will gradually implement the two-child norm for availing government benefits in the state. Now it has been made clear that except for the tea tribes and Scheduled Tribes and Scheduled Casts, the two-child norms will be applicable for all benefits of the government, including loan waiver schemes. The chief minister, however, has also acknowledged the fact that "education, health, ending child marriage and financial inclusion" are the core means to control population, particularly among Muslims. While the stringent population control approach itself has been abandoned as both inhumane and unrealistic, any sectarian approach in this regard may invite more challenges than sustainable solutions. Exponential population growth among the East Bengal-origin Muslims in Assam has been a real concern. It has given birth to anxiety among the indigenous communities regarding their political security. The emergence of the All India United Democratic Front in the East Bengal-origin Muslim dominated districts as a formidable political force has added fuel to this anxiety. However, the divisive political agenda on the part of the incumbent government constantly driving the exclusionary narrative of "we" versus "they" and also bringing in the narrative of the civilisational threat posed by the exponential population growth among the community has only helped the dominant political forces among the community plant prejudices and unscientific temperament, and tighten the patriarchal hold.



"Will benefit in longer run"

BADRI NARAYAN
DIRECTOR, G B PANT SOCIAL SCIENCE INSTITUTE, ALLAHABAD UNIVERSITY, UTTAR PRADESH

Population is a hard reality. A state like Uttar Pradesh with 200 million population needs to respond to this reality. That is why the government led by Yogi Aditya Nath



proposed the population control Bill recently. The governance in this drastically changing world remained not only limited to the material and social resources but also being extended to the governance of biological resources. The eminent thinkers Michel Foucault and Giorgio Agamben offer us perspective of governance-centered biopolitics which also provides us insights to understand the state-led projects of population control being exercised in various countries of the world. In this paradigm, governance is also extended to govern our bare life or biological body.

This proposed Bill is in one way an attempt to save society from population instability which may transform as population bomb. This situation of population instability may produce a food crisis and other crises related to socio-economic resources. The draft Bill is framed in a way to be implemented by various incentive and disincentive to follow or not follow the rules. Before that we have seen awareness campaigns launched by the government to manage population. We have also experienced a tough policy like *nasbandi* for population control in India. TFR of Uttar Pradesh is 2.9, according to 2018 sample registration system data. It needs to come to 2.1, and then it will be replacement level fertility. If a two-child policy is enforced properly, it may help us to achieve a TFR of 2.1(on average two children per couple). However, still it will take one generation (almost two to three decades) for the stabilisation of population.

"A persistent problem"

K S JAMES
DIRECTOR, INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES, MUMBAI, MAHARASHTRA

Over population concerns in India have a very long history and continue to persist. However, visible changes are noticed in bringing down the fertility level towards the end of last century and in the two decades of the 21st century. India reached a near replacement level fertility of 2.2 by 2018. The important question, therefore, is what led to the faster decline in fertility in recent decades? There are three broad routes of fertility transition, and all are to some extent experimented in India. Fertility transition through social development and women's empowerment was the success story of Kerala and most of the western world. The other route is effective service delivery, particularly of family planning services. Many states in India have achieved success under this category and Tamil Nadu is the forerunner. Yet another route is imposing very strong incentives and disincentives. A few states in India tried electoral disincentives but its success was not very evident. The most important route for success in bringing down fertility appears to be delivery of services. DTE

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Kandha tribal communities grow the unique Kandhamal turmeric without any farm inputs but a mulch prepared from leaf litter of sal trees

FADING COLOUR

Establish farmer producer organisations to ensure that growers of the intensely flavourful golden Kandhamal turmeric do not turn away from it

ANKIT MAHAPATRA

CALL IT the result of the agro-climatic conditions of the hilly Kandhamal district in Odisha, or the ages of careful nurturing by tribal communities, but the region's native turmeric variety remains unmatched in its golden hue and intense aroma. Also famous for its healing properties, the Kandhamal turmeric in 2019 was accorded the Geographic Indication (GI) tag, which provides legal protection against unauthorised use of its name and thereby boosts popularity and exports of the original variety.

The organic origin of the spice lies in its simple ways of cultivation, which begins around March with the collection of leaf

litter of sal tree (*Shorea robusta*) from the hilly forests. The entire family engages in this activity of collecting and transporting the leaf litter to the field. Farmers say it takes them weeks to gather the needed quantity of leaf litter. Once the land is prepared and the pear-shaped mother rhizomes are planted, a thick layer (about 10 cm) of the mulch is spread over the field. It not only protects the saplings in the initial weeks but also takes care of the crop's nutritional needs over the next 10 months till the turmeric is ready for harvest. While the monsoon rain meets irrigation needs, weeding is done only twice—first, 60 days after sowing, and then after 90 to 100 days. Harvesting starts in January-February, usually after a few winter showers have dampened the soil.

For curing, farmers boil fresh turmeric in an aluminium vessel for about an hour till a white froth appears; dry the boiled rhizomes for 20 to 25 days; and then follow the traditional method of rubbing the dry turmeric fingers manually before packing it for sale. The process is painstaking. But for these tribal communities dwelling in the hills of central Odisha, who own small landholdings and sell forest produce like honey, arrow-root and tamarind, turmeric is a major source of cash income.

To help them earn from their exclusive turmeric variety, Kandhamal district collector in 1998 set up a non-profit society, Kandhamal Apex Spices Association for Marketing or KASAM, which promotes the spice in domestic as well as international markets. KASAM procures dry turmeric at ₹60 per kg, which is ₹8-10 higher than the local market price, and has so far facilitated organic certification for about 5,000 farmers. Though KASAM has significantly helped improve the income of its 11,000 member farmers, a majority of the 60,000 turmeric growers in the district remain outside its network, which operates in five of the 12 blocks. Even those who are members of KASAM do not always receive its support. Since the society procures turmeric by order, in times of low demand it does not buy the entire produce of a farmer, who then sells it in the market at a cheaper rate.

Though procurement has suffered a huge setback with disruptions in the supply chain due to the pandemic, the fact is a single organisation with limited capacity cannot cater to the needs of so many farmers. A recent visit to Kilabadi and Ganjukhol villages shows farmers are already reducing acreage under turmeric.

FARMER PRODUCER ORGANISATIONS CAN HELP TURMERIC FARMERS REALISE BETTER PRICES. THEY CAN RECEIVE SUPPORT FOR VALUE CHAIN ACTIVITIES UNDER THE "ONE DISTRICT, ONE PRODUCT" SCHEME



However, some recent policy developments have created an opportunity which can be used to improve the lot of turmeric farmers in Kandhamal. One such scheme is the "Formation and Promotion of Farmer Producer Organisations (FPOs)", launched in March 2020, under which the Union government has allocated ₹6,865 crore to establish 10,000 new FPOs across the country in the next five years. In Kandhamal, such FPOs can be set up to connect the turmeric farmers to domestic as well as global spice markets. KASAM, which is already planning to act as a cluster-based business organisation, can hand-hold the FPOs in the beginning.

The FPOs can receive financial support for infrastructure and value chain activities under another scheme, "PM—Formalisation of Micro Food Processing Enterprises", which was launched in June 2020 with the motto of "One District, One Product" to promote one special product from every district; in Kandhamal, turmeric has already been identified as the special product of the district. The FPOs can also participate in agricultural fairs and other brand-building exercises to popularise "Kandhamal Haladi" as a GI-tagged organic product. Tribal youths, if motivated to take up agriculture-related entrepreneurship such as making and marketing of value-added turmeric products, can act as the agents of change. DTE

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(Ankit Mahapatra is research scholar at the Indian Agricultural Research Institute, Delhi)

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- Etc

A website on Environment and Development for the Young and the Curious

ON THIN AIR



An aeroponic farm maintained by Neoponics Projects India Pvt Ltd in Coimbatore, Tamil Nadu

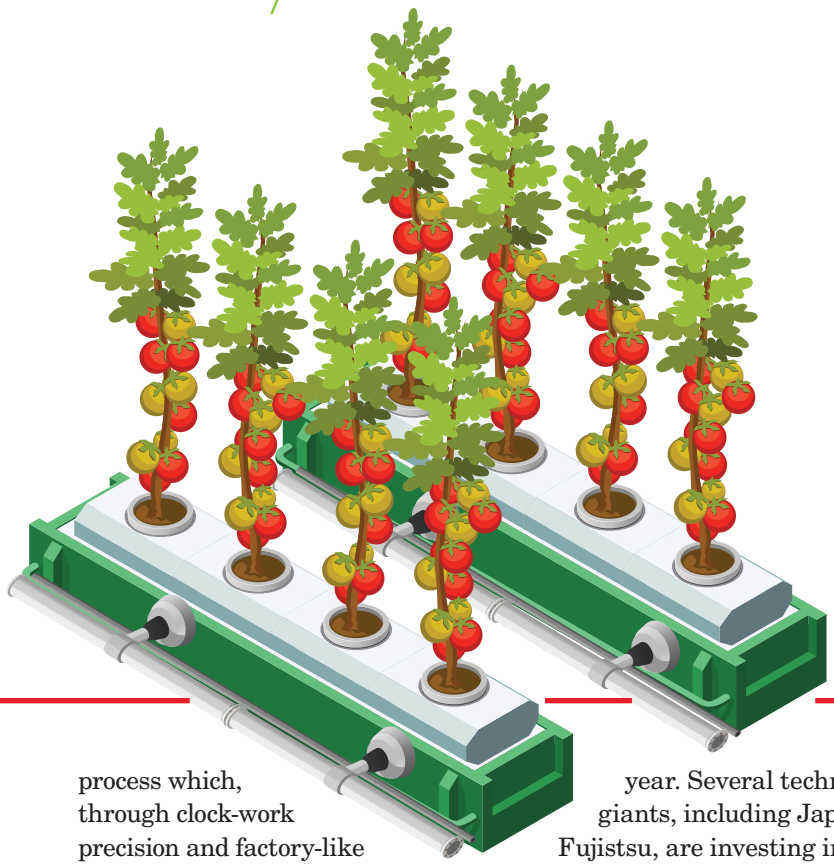
Agriculture students demonstrate how aeroponics, once a niche and costly cultivation method, can help urban households

RAJIT SENGUPTA
NEW DELHI

SOMETIME IN the late 1990s, US space agency NASA teamed up with an agro-biology company and a high-impact space life research centre, both based in the US, to embark on an ambitious experiment. The aim was to grow plants aboard the Mir space station, which operated in low Earth orbit. In 1997, the team negated the fundamental agricultural requirements—soil, sunlight and intensive water for irrigation—and successfully grew adzuki beans in microgravity. The cultivation technique, known as aeroponics, was well established since the 1940s. But it had remained largely confined to research and innovation till the NASA experiment demonstrated its potential as an effective and efficient means of growing plants anywhere. While NASA has since used the technique to successfully grow a variety of crops, including lettuce, mustard and radishes, in space, aeroponics has also captured popular imagination here on Earth.

Aeroponics is essentially an indoor farming technique in which plants grow in a controlled environment that is free from soil or any other aggregate media. Roots hang suspended in the air while a nutrient solution is sprayed as a fine mist. Spraying is a specialised

PHOTOGRAPH: PRABHU SANKAR



AEROPONICS COME HOME

This process, in which plants are grown without soil, intensive water and sunlight, requires laboratory-like settings with precision monitoring. A group of students say aeroponics can be successfully grown even within domestic settings

WHAT WE NEED

01 A perforated container/sieve to grow the seeds

02 A large tub over which the container can be suspended. The roots should not touch any surface

03 Charcoal pieces to absorb excess moisture

04 A sprayer

process which, through clock-work precision and factory-like settings, can imitate plant growth across multi-level chambers, which remain lit by LED lights of different calibrations. Such a system does not require much land and can be set up in a vertical manner. As per NASA water usage in the system reduces by an impressive 98 per cent. Since the roots get the nutrients directly, fertiliser usage also decreases by 60 per cent. Pesticides are fully eliminated, as the absence of soil reduces chances of diseases.

In recent years in developed countries like the US, concerns over food safety and pesticide use have fuelled a boom in such plant factories. In 2009, US-based AeroFarms made news when it converted old rusted warehouses in Newark state into tall walls of green saplings, using aeroponics. By 2017, the company had become the world's biggest vertical farm, with the capacity to harvest roughly 1,000 tonnes of greens per year. Several technology giants, including Japan's Fujistsu, are investing in the technology. The technique has also opened up the possibility of food self-sufficiency for countries like Singapore that have till now been import economies and do not have the resources, notably land, freshwater and labour, to grow food. The island nation is banking on aeroponics to increase its own food production from the current 10 per cent to 30 per cent by 2030.

In India, which is land surplus and has a large agricultural population, the technology has so far been the mainstay of a few specialised industries and research laboratories, particularly those producing potato tubers. One such is the Central Potato Research Institute, which earlier this year started growing mini-tubers (seed potatoes) through aeroponics as it provides a contamination-free environment. It set up three units with capacity to grow 1 million mini-tubers every three months.

Prabhu Shankar, founder of Tamil Nadu-based Neoponics Projects India Pvt Ltd, which delivers made-to-order aeroponic farm systems for commercial farmers, explains why the technique has remained limited to large-scale commercial farms or research laboratories, whether in India or in other countries. He says the systems are expensive to set up and can cost around ₹8 crore per hectare. They are also technology-intensive. Crops get affected even if there is a 15-minute disruption in electricity supply or watering cycle. The temperature also needs to be maintained at the ideal level. The other challenge is preparing the nutrient solution, which varies not only from crop to crop but also depends on the location and quality of water available. "Nutrient management and climate control are the main reasons aeroponics has failed to scale up beyond the laboratory level in India," says Shankar,



Take 3-4 table spoons of **seeds into a jar or vessel.** Fill it with water and leave it overnight



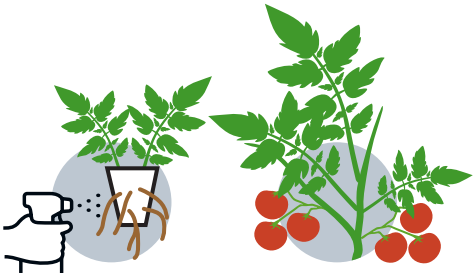
Drain out the water in the morning **and cover it with a lid** for the sprouting process to start



Check the moisture level every morning and add water if required



After three days, the sprouts will be suitably grown. Transfer them to a perforated container. **Keep it in a naturally well-lit place**



Spray the nutrient-rich water and wait for **5-6 hours before spraying only water.** This cycle needs to be repeated at least 4 times a day

After 8-10 days, the vegetable/ fruit is ready for harvest

How to prepare the nutrient solution

- Take 1 tablespoon of vermicompost and mix it with 1 litre of tap water, and leave it for two days
- The solution needs to be diluted further when administered to new saplings: one part liquid and two parts normal water

Plants that can be grown

Tomatoes, lettuce, mint, basil, spinach, mustard greens, thyme, basil, mint, parsley, lemongrass and wheatgrass

Source: College of Engineering Roorkee, Uttarakhand



adding that the systems his company provides depend heavily on the internet of things to monitor the parameters.

OUTSIDE THE CHAMBER

A recent demonstration by agriculture students at the College of Engineering Roorkee (CER), Uttarakhand, shows it is possible to set up aeroponic systems within domestic settings and without sophisticated technologies. At first glance, their setup looks like an excellent do-it-yourself project: a sieve-like container full of leafy greens with slender roots hanging from the gaps. "In the pilot project, students grew gram seeds by repurposing commonly available materials at home," says Deep Gupta, who heads the department of agriculture sciences at CER.

After successful germination of seeds, the team simply transferred the sprouts to a perforated basket and kept it in a naturally well-lit area instead of a closed chamber lit with LED lights. Rather than using a mechanised sprayer, they sprayed the nutrient solution and water manually at regular intervals, and repeated the cycle at least four times a day. Plants were ready for harvest in eight to 10 days. Gupta says in multiplex apartments, with limited space, aeroponics is a better alternative to kitchen gardens. In fact, it can be installed in kitchens. Harvesting is easier and simpler, especially for root crops. "Compared to traditional farming, our system needs 90 per cent less water and 60 per cent less fertilisers, and does not require pesticides," says Gupta, adding that it is suitable for several crops, from lettuce and spinach to tomatoes, whose roots adapt the best to conditions like oxygenation (oxygen diffusing passively) and dampness (see 'Plants that...'). The technique has the potential to help improve the economic conditions of small land holding farmers, says Sudhir Kumar Gaur, professor at the school of management, CER.

IN AN AEROPONIC SYSTEM, THE ROOTS HANG SUSPENDED IN THE AIR WHILE A NUTRIENT SOLUTION IS DELIVERED TO IT IN THE FORM OF MIST

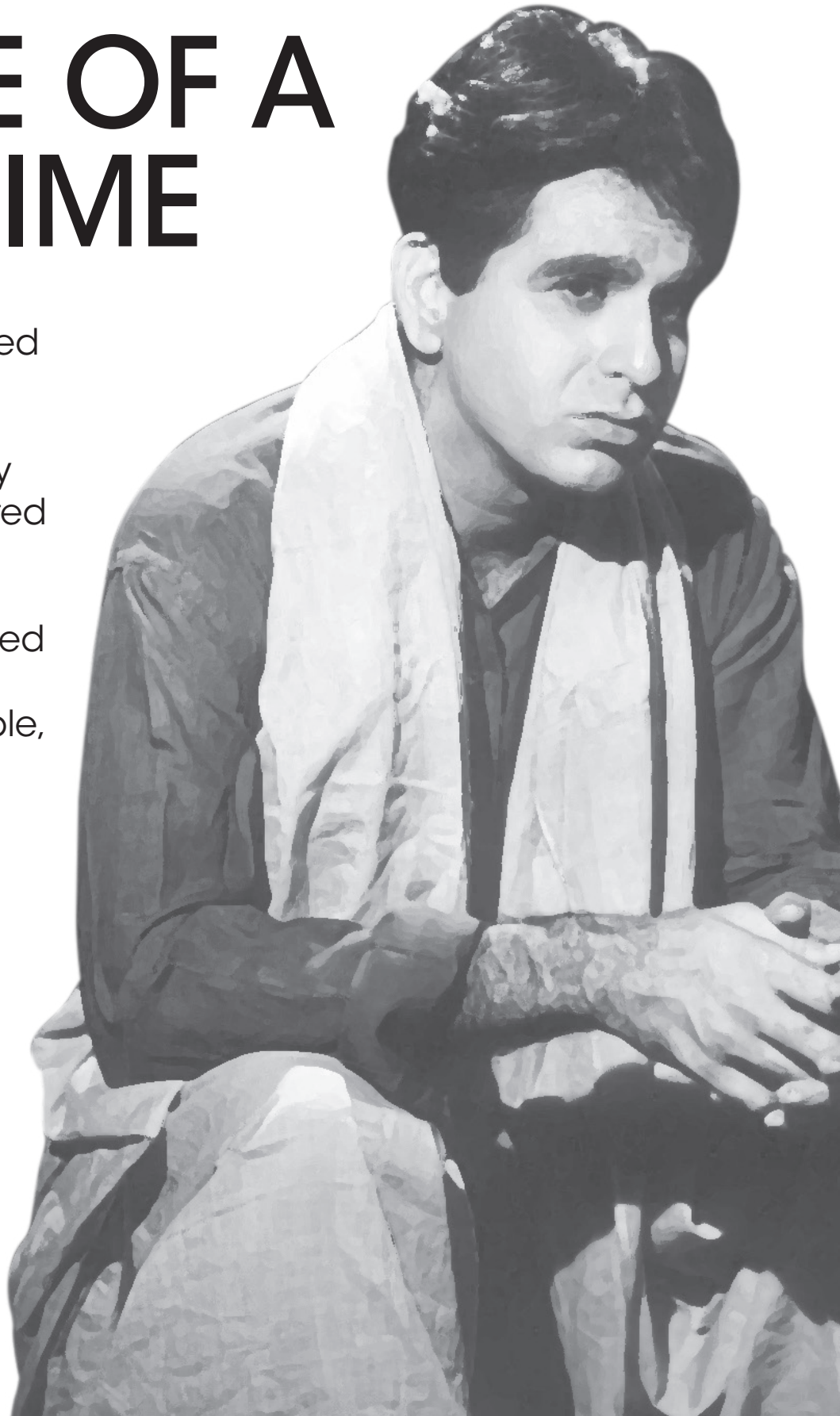
Praveen Kumar Singh, principal scientist at the Indian Agricultural Research Institute, Delhi, doubts the potential of aeroponics in India. However, he says, if successfully implemented it can prove a boon for urban households that invariably depend on heavy metals-laced leafy vegetables as they are grown along *nullahs*. Since plants in aeroponic systems do not have to search for nutrients, they absorb more minerals that improve their yield. Lettuce, that is harvested after 50 days, can be reaped 10-15 days early, Singh explains. Gupta assures the model her students have developed is easy to set up and maintain, and can be useful in urban settings. DTE

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ROLE OF A LIFETIME

Dilip Kumar's career coincided with a newly Independent India marred by many self-inflicted tragedies, and the roles he played resonated with a large section of people, cutting across classes

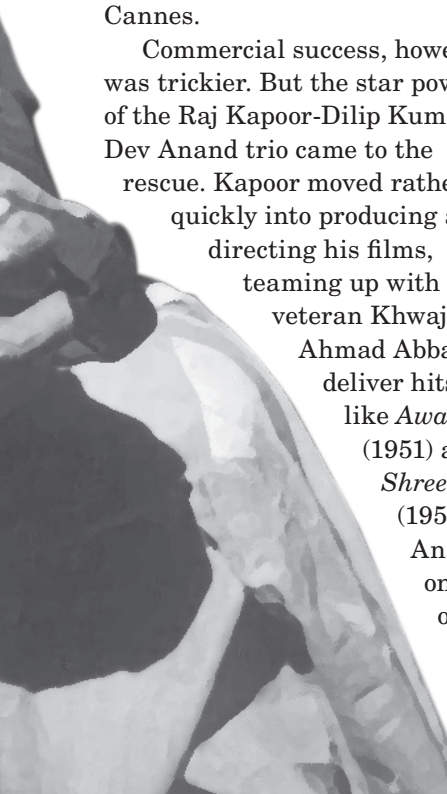
JOYJEET DAS



AS WE talk of the politics of development in India today—with 500 million hand-held 4G-powered screens delivering inanities round-the-clock—one is increasingly amazed at how the early propagandists for a progressive nation used the screen. As a thespian committed to bring up issues that mattered to the people, Dilip Kumar invested both his stardom as well as his skill as an actor to the cause. The more he seasoned, the deeper he dove to fathom the complexities of the country's milieu.

When a 20-something Yusuf Khan walked into the studio of Bombay Talkies in the early 1940s, film-going had already caught on in the newly independent country, and there were filmmakers serious about using cinema to push what mattered to them, including those connected to the Indian People's Theatre Association (IPTA). Chetan Anand's *Neecha Nagar* (1946) even won the prestigious "Grand Prix" at Cannes.

Commercial success, however, was trickier. But the star power of the Raj Kapoor-Dilip Kumar-Dev Anand trio came to the rescue. Kapoor moved rather quickly into producing and directing his films, teaming up with IPTA veteran Khwaja Ahmad Abbas to deliver hits like *Awaara* (1951) and *Shree 420* (1955). Anand, on the other hand, was wielded by directors (including brothers Chetan and Vijay) into effectively portraying urban, conflict-ridden characters in movies like *Kala Pani* (1958) and *Guide* (1965).



Unlike the two, Dilip Kumar generally stayed away from direction and production. He made up for that with avant-garde subject selection and meticulously researched and rehearsed portrayals. Aficionados still swear by his understated monologue in *Footpath* (1953), where he played a black marketeer who gains riches by hoarding foodgrain and medicines, but wakes up to the damage he has done to the society when an epidemic breaks out and the poor—from whom he rose—are at the receiving end.

Films like *Footpath*, *Awaara* and Dev Anand-starrer *Baazi* (1951, directed by Guru Dutt) were alarm bells for Independent India that the road ahead was not easy, more so for the generation that everyone was betting on to build the nation. By drawing in big numbers at the box office, such films did a sterling job of educating the masses—a quality that was noticed by the first prime minister, Jawaharlal Nehru.

"The soul of India lives in villages," Mahatma Gandhi had famously said. Apart from agriculture, this soul drew nourishment from a plethora of other traditional livelihoods, several of which faced competition from newly-developed technology imported from the West. The rate of agrarian production started to increase at the cost of farmers.

As India completed its first decade of Independence, B R Chopra's *Naya Daur* hit the screens on August 15, 1957. The movie's engrossing plot of camaraderie, friendship and romance was set against the backdrop of mechanisation and how it eats into livelihoods of people and destabilises communities.

India was industrialising, and here was a blockbuster that warned how capital-intensive modernisation was bound to amass wealth and means of production into the hands of a few, sharpening social inequalities. It also prescribed a way out: unity and cooperation among the masses.

WHEN A 20-SOMETHING YUSUF KHAN WALKED INTO THE STUDIO OF BOMBAY TALKIES IN EARLY 1940s, FILM-GOING HAD ALREADY CAUGHT ON IN THE COUNTRY, AND THERE WERE FILMMAKERS SERIOUS ABOUT USING CINEMA TO PUSH WHAT MATTERED TO THEM

Such a theme could easily have gone over the top, but for the careful manoeuvring by Chopra and Dilip Kumar's mastery in portraying Shankar, the tonga-drawing protagonist who picks up a challenge to race a bus and sets off to build a new road for that.

The subject resonated well across the country and the film was dubbed in Tamil. Only one Hindi film released in 1957 was a bigger hit than *Naya*

Daur—Mehboob Khan's *Mother India*, a seminal study of rural India and feudal oppression, which made global cinema sit up and take note.

REFLECTION OF THE TIMES

Dilip Kumar himself picked up the theme of feudal tyranny and produced the movie *Gunga Jumna*. He wrote the story and screenplay of two brothers—one upholding the law and the other being a rebel to take on the wicked *zamindar*, the rich and the powerful.

In his autobiography, *Dilip Kumar: The Substance and the Shadow*, he wrote "… I felt it was time for me to make a picture that raised some critical issues about the people of rural India who had gained little from the country's independence from foreign rule. The oppressed farmers and tillers of the soil were leading a life of slavery and were being exploited and swindled by the mercenary landlords."

To drive home the point, Dilip Kumar played the outlaw—going against the norm of a hero being a goody-two-shoes—to rave reviews. There was extensive effort to work out the dialect so that the film could be justifiably set somewhere in the Hindi heartland. Nitin Bose helmed the technically brilliant production, processed at the famous Pinewood Studios in the UK.

The movie made quite a splash at the festival circuit abroad, a rarity for Hindi films. Some 84 million people are estimated to have watched it, 32 million of whom were in the erstwhile Soviet Union.

In between there was *Paigham* (1959), where Dilip Kumar essayed a young man who tries to unionise his colleagues at the mill after discovering that the owner was defrauding the workers. The theme found resonance in the 1970s, by when labourers' relation with other means of production had worsened to militant levels across India.

In 1970, Dilip Kumar's only full-fledged Bangla film, *Sagina Mahato*, released. Based on a story by Gour Kishore Ghosh and directed by Tapan Sinha, the film was a full-scale study of labour, community, the trade union movement and its pitfalls set in the tea economy of the Darjeeling hills in 1942-43—a time when people were fighting both fascism and imperialism and "in this cataclysm a new India was being born". It was also the region where the Naxal movement sprang up in the late 1960s, when the film was being conceptualised.

DILIP KUMAR, EVENTUALLY, WAS MORE THAN AN ACTOR. HE REPRESENTED A GENERATION THAT PASSIONATELY BUILT AN INCLUSIVE INDIA AND NEVER SHIED AWAY FROM ITS WARTS. HALF A CENTURY AFTER MOVIES THAT HIGHLIGHTED FARMER EXPLOITATION, THE SITUATION HAS NOT CHANGED MUCH, KUMAR WROTE IN HIS AUTOBIOGRAPHY RELEASED IN 2014

The coming together of the two erudite minds to critically look at labour movements led to a hugely successful film in a politically charged atmosphere. It was judged the "Best Afro-Asian film" at the Moscow International Film Festival. The team remade the film in Hindi—however, to not much success.

Above all, what made Dilip Kumar stand out from his contemporaries was his investment in understanding and honing the craft of acting. The term "method acting" gained currency in Hollywood as a young Marlon Brando crossed over from the stage. Dilip Kumar had developed his own distinct "method", with some useful nudges from Ashok Kumar: "It's quite simple. You just do what you would do in the situation if you were really in it," the senior Kumar advised him. It triggered a long journey of perfecting his craft to instil realism on screen—something frightfully uncommon in Indian cinema. Eventually, Dilip Kumar was more than an actor. He represented a generation that passionately built an inclusive India and never shied away from its warts.

It is 2021. We are fighting a once-in-a-century pandemic, amid deep-seated prejudices and social divisions. The workforce is still a harried lot, much more than even before; inequalities are ever-deepening. "The situation has not changed much today, more than half a century after (*Mother India* and *Gunga Jumna*) exposed the exploitation of farmers, for whom the soil they till and plough is sacred," wrote the ever-observant star in his autobiography.

As he breathed his last on July 7, 2021, the national capital laid besieged by farmers protesting the new agricultural "reforms" for months on end. DTE

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Poor by birth and geography

IT IS certain by now that the world will miss the Sustainable Development Goal of ending extreme poverty by 2030. The pandemic has increased poverty, cutting across rich and poor countries. There are regions where it is concentrated, like South Asia and Africa, and has been chronic for generations. As the world recovers from COVID-19, it is likely that poverty will decline to pre-2020 levels. After that, the challenge of poverty eradication will be back to these old geographies.

However, there are signs of change in both the demography and geography of poverty by 2030. As one looks at various poverty scenarios for the future, particularly the World Data Lab's World Poverty Clock that gives live eradication numbers, it emerges that poverty will be further concentrated in a few countries in Africa. These countries are also conflict-ridden, politically and socially unstable, and historically being unable to reduce poverty. In a way, the hope of an extreme poverty-free world hinges on its eradication in the most difficult of situations.

The World Data Lab estimates that two-thirds of the world's extreme poor will live in 39 countries, classified by the World Bank as "fragile states", by 2030. These countries have "high levels of institutional and social fragility" and are "affected by violent conflict". But within these fragile states, countries in Africa—particularly Nigeria and the Democratic Republic of the Congo—will have the bigger share of the poor. An analysis by Brookings Institution says, "Geographically, poverty is increasingly concentrated in Africa and success in ending poverty globally will largely depend on African fragile states." Currently, there are four fragile states in the top 10 countries with the poorest population. In 2030, this could go up to five, with Nigeria and Congo as the top two, accounting for one-third of the world's extreme poor population.

To put it another way, as the Brookings analysis indicates, whether a newborn will be poor would depend on his or her place of birth. To be born in a fragile country, specifically Nigeria and Congo, means one would be poor and endure extreme poverty. These countries already have a high poverty rate among children. For instance, 50 per cent of Nigeria's extreme poor population consisted of children (under the age of 15 years). Brookings' analysis of World Data Lab's poverty numbers says half the children in fragile states were extreme poor. It concludes that "if a child is born in a fragile state, it has a 50 per cent chance to grow up in extremely severe conditions."

Reduction of poverty among children must become the point of focus in global eradication efforts

Poverty among children is always considered a perpetuation of the situation in which their parents grew up. One can call this a trans-generational shifting of poverty, thus having a higher chance of becoming chronic among the population groups concerned. Last year, the Multidimensional Poverty Index by the United Nations Development Programme and the Oxford Poverty and Human Development Initiative found that half of the world's 1.3 billion poor people were under the age of 18 years. This means the world already has a high population of poor children.

So, the world's focus while eradicating poverty has to be on the well-being of children. First, ensure that newborns are not victims of their parental situation. Second, even if born poor, the children must be helped enough to escape the poverty trap. To put it in context, poverty eradication has to be a children's welfare programme. This makes it a difficult though desirable development goal, bigger than the 2030 one. DTE

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ONLINE CERTIFICATE TRAINING PROGRAMME

'NEW VAASTU'
DESIGNING SUSTAINABLE HABITATS IN A POST-PANDEMIC WORLD



DATES: August 23-September 17, 2021
(self-paced weekly modules)
LAST DATE FOR APPLYING: August 18, 2021
LANGUAGE OF INSTRUCTION: English
PLATFORMS: Moodle and Zoom
TOTAL STUDY HOURS: 20 hours
(5~6 hours per week)

COVID-19 has scarred the world. There is a realisation that the world cannot function in a 'business-as-usual' manner any longer. There is a clear need now for rethinking how we live, including the way we approach our built environment.

Thermal comfort in buildings is crucial parameter that needs to be considered - temperature, humidity and natural ventilation are key characteristics that define thermal comfort and have a direct relationship with the spread of infection and ill-health inside dwellings.

The School of Habitat under Anil Agarwal Environment Training Institute, a Centre for Science and Environment (CSE) initiative, is announcing a new online training programme on the practices of what it refers to as the 'New Vaastu' - a concept that is designed to respond to the twin challenges of sustainable development and the COVID pandemic.

The training programme will introduce participants to the ancient Indian traditional practices of Vastu Shastra to the modern codes that regulate the current built environment and explore the synergies/science between the past and their relevance and learnings to the current times. It will emphasize the interdependent roles the natural elements play as enablers of a sustainable and liveable environment as well as catalyst to reduce disease burden in our buildings.

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- India Cooling Action Plan, urban heat island effect and thermal comfort
- Building envelope, daylighting components, fenestration design, material properties and their market penetration.
- Resource prudent designing for circularity (water, waste, energy efficiency, renewable)
- Introduction to building simulation and low-energy mechanical cooling techniques

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Students pursuing architecture, planning and engineering, architects, academicians, professionals from the building industry and anyone enthusiastic to learn about sustainable built environment.

WHAT IS THE PROGRAMME FEE?

- Rs 3,000 per participant (For applicants from India)
- USD 100 per participant (For applicants from countries other than India)

Partial sponsorships, early bird (registrations before July 31) and group discounts available.

HOW WILL THE TRAINING BE IMPARTED?

Conducted online on Moodle and Zoom platforms through recorded video lectures, live lectures, exercises, reading materials and other resources.



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R.N.I. NO. 53588/92 POSTAL REGN. NO. DL(S)-17/3109/2021-2023
ISSN 0971-8079. Licensed to Post without Pre-payment U(SE)-44/2021-2023 at Lodhi Road HO,
New Delhi-110003. Published on 1st of every month. POSTED ON: 2-3 of the same fortnight, Total pages: 60

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