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- Representatives of Resident Welfare Association

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COVID-19 has made the invisible visible

OF THE images that haunt me, these are particularly heart-rending—one, that of the little girl who died off the coast of a European city as her parents were trying desperately to reach there on boats from a faraway land, for a better future. The other, more recent, is of an elderly woman, with all her belongings on head, walking kilometres to get home from a COVID-19 locked-down city in India, leaving behind her dreams of work and going back to the village she came from. The third is of the young man—also escaping from a locked-down city—who died after walking for days, just some hundred kilometres from his village.

For the past one year, I have been writing about migration—from the perspective of the increased insecurity in villages, wrecked by poverty, agrarian distress and now by the weird weather that makes agriculture more and more unviable and life unbearable. It was due to the traditional push (people leaving because they had no choice) and pull (people leaving because they wanted more choice) factors, but at a much heightened pace and scale. This exodus was hardly documented. The World Migration Report 2020 says global migration is on the rise—roughly 3.5 per cent of the world population moved from one country to another in 2019. But there is little in-country migration data. In India, the last official count of migrants was in the Census of 2011, which was outdated and did not explain the huge numbers of what I called “illegal” settlements growing in urban areas, congested, without urban services and, most often, the hub of industrial activity, which in turn is the cause of pollution in the city.

Today, these “invisible” people have become visible. We see thousands and thousands of “migrants” are cramped in relief camps because the government will not let them go home fearing that the novel coronavirus will spread through them to villages and remote districts. We see them because they are desperate to leave the city and because there is no public transport operating; they walk back with their belongings, their children and with no food and no place to sleep. When asked, they have told us they do not want food; they just want to go home. Their cry is unmistakable; heart-wrenching.

Now, the numbers are emerging. The Union government in its affidavit of April 12, 2020 filed in the Supreme Court said there are some 40,000 relief camps in operation across states, where some 1.4 million migrant workers are housed and fed. But this is an underestimation. There are many who are not in the camps; they are on the road, struggling to reach their destination. On April 29, some 40 days after the nationwide lockdown began, the Union government said that the stranded people could go home—buses would ferry them across states. This decision, however difficult because of the dangers of the spread of the virus, is right and necessary.

We need to discuss the return and what this will mean. The first is about the works they will leave behind. Migrants may have been illegal in some countries and unrecognised in others, but the fact is that their labour was vital for all economies. Today vast parts of Europe, Australia and the US do not have enough labour to harvest their crops. What then will be the fate of food in the coming months? In India, the impact will be felt as the lockdown ends and labour is in short supply to restart the economy. Will this make us value them more; provide them better opportunities and benefits so that they return? Will this give migrants a makeover in the post-COVID-19 world?

There is also the other reality that COVID-19 has thrown at us. The places where the disease is most likely to breed is where there are no urban services; where settlements are overcrowded; where safe water supply and sanitation is inadequate and people have no way to stay safe. This is where we have allowed our workforce to live. Consider Singapore, where the virus has made a virulent comeback. The island nation, always confident of its cleanliness record, is finding that it did not take care of the dense settlements where its migrant labour lives. It is the same elsewhere. So, will we rework the need to provide better housing, water and sanitation services to our urban poor, including the migrant labour? Will this mean we will invest in improving the environment in which they live and work?

Lastly, what happens when the migrants go back home? Will they want to return? Is this the opportunity to invest in rural economies so that they have the choice not to leave? I want to discuss this the next fortnight. **DTE**

Migrants make economies tick and now with their return there are many questions about the future of work, of environment and of rural rebuilding

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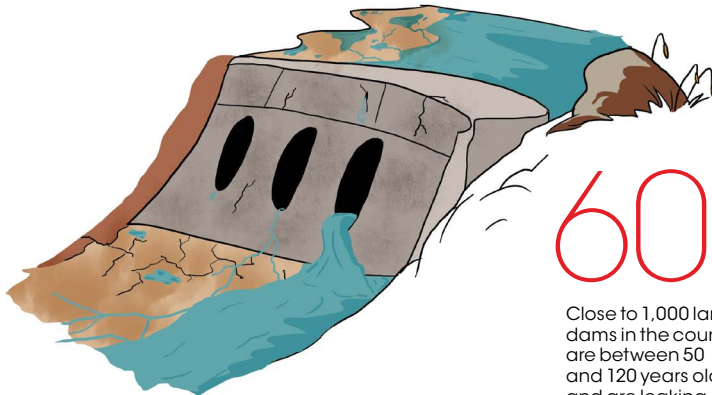


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Close to 1,000 large
dams in the country
are between 50
and 120 years old
and are leaking

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Engage



Focus on weaker sections

This refers to the editorial, "Resource literacy of the poor" (1-15 March, 2020). It is indeed true that the poor are not poor in knowledge. In fact, they are more adaptive than others. It is also clear that the rural poor are more vulnerable and susceptible to climate change than the poor elsewhere.

Indian villages have a structural configuration where "Dalits" and the poor inhabit the periphery of the settlement, mostly on lower land. Topologically and geographically these areas are usually the worst to dwell. These areas are also the first to be threatened by climate change. Not only jobs, but lives of the inhabitants are also disturbed by climate change. For instance, altered crop patterns and increased farm mechanisation is reducing their jobs. The governments must take adequate measures to combat the losses incurred by the weaker sections.

TAPOMOY GHOSH
KATWA, PURBA BARDHAMAN

Lost here, gained there

This is in reference to "COVID-19 outbreak: More hand washing can increase India's water woes" published online on March 21, 2020. The water lost in washing hand is, perhaps, being compensated by the water gained due to the complete or partial closure of commercial establishments, such as restaurants, hotels and other public places like airports. Has the analysis taken that into consideration?

ASHISH VERMA
VIA EMAIL

Stuck in a loop

This is in reference to three editorials, "I am biased, for people" (15-31 January, 2020), "Of pests and climate change" (1-15 February, 2020) and "Contours of coronavirus" (15-29 February, 2020). The climate crisis and human activities like mining, compounded with ineffective governance and lack of incentives, have led to a decline in agriculture. This has resulted in large-scale migration of people, especially the youth, to urban areas, which increases the pressure on cities. As more people become a part of the "globalised world", our production and consumption increases, and so does our irresponsibility towards our resources, which leads to problems of waste management, pollution and ultimately climate crisis.

We are in a loop; a loop set by the capitalists and the government. The only way to break the cycle is by improving the status of agriculture in our country. But as per the article "Expert's guide to rural distress" (16-29 February, 2020), that too will not happen.

The focus of non-profits is still on fossil fuels and waste management. This must change and shift to rural areas. But we also must not develop rural areas like we have developed our cities. We have to think beyond that. The loop of the climate crisis-induced migration has to be broken. This should be the greatest concern.

ARYAN BAJPAI
TULJAPUR



Vaccine in sight?

There are 70 projects to develop COVID-19 vaccines across the globe, as per a World Health Organization release on April 11, with three



having reached the human testing stage and 67 still in pre-clinical levels. Pharma companies target to develop a vaccine against COVID-19 in a couple of years, but the task can sometimes take decades and success is often elusive.

Nod to plasma therapy

On April 16, the Indian Council of Medical Research approved clinical trial of convalescent plasma therapy (CPT) for COVID-19 patients. Plasma is the yellowish liquid component of blood that contains antibodies to fight against infections. States like Kerala, Maharashtra and Delhi are set to use CPT.

Heat can curb COVID

A spike in the mercury can curb the spread of COVID-19. A Hong Kong study found that at 4°C, over 90 per cent of the virus remained on surface after 14 days of incubation; at 22°C about 50 per cent remained after 7 days and none after 14 days; and at 37°C they halved after a day and none remained later.



No religious profiling, please

This is in reference to "Refrain from religious profiling of COVID-19 cases: WHO in context of Tabligh" published online on April 7, 2020. The attacks on Muslims by right wing groups under the cover of the government are sad. It has made the rest of the Indians sick. It is good that the issue has been raised. The government slept while COVID was breaking out in India in January.

GIRIRAJ SHARMAJI
VIA EMAIL

Don't imagine stuff

This is in reference to "Mr Modi, you made the pandemic another event" published online on March 19, 2020. The author is clearly prejudiced. He has not realised the extent of the problem the coronavirus is going to create. Such a problem needs tremendous participation of the people. The chain of coronavirus infection has to be broken. The charisma of Prime Minister Narendra Modi is such that every common person immediately relates to him. Only some mean-minded people see imaginary designs behind the steps taken. Communists, who do not like anything constructive happening in the country, write such articles, which are devoid of any thinking. I did not expect this in *Down To Earth*.

VINAY DEODHAR
VIA EMAIL

Save Kolkata's canal system

This is in reference to "Urban commons: Almost ignored in city planning" published online on February 27, 2020. The canals that once connected the city of Kolkata are a large part of its history. Today these canals are a part of the drainage system that leads to the sea. However, the banks of these canals provide a safety net to various slums and other settlements that lie alongside. Apart from fetching fruits and vegetables that grow on these fertile soil, the people living in these areas also put up their latrines on the banks. With the recent beautification campaign taken up by the municipal corporation, the banks of these canals are being turned into cement embankments that not only destroy the ecosystem, killing the homes of rodents and reptiles, they also prevent the safety net provided by these common pool resources.

ANKITA MONDAL
VIA EMAIL

India can fight this virus

This refers to the interview, "60% of India's population would be infected by COVID-19 in a year's time" published online on March 13, 2020. The statement made by infectious diseases expert T Jacob John is clearly hypothetical. If the country can stop the spread of the disease from reaching stage three (community transmission), the chain can be broken. No doubt it will take time to develop a vaccine. But a few decades ago we were suffering from chickenpox and the plague, which have now been cured. It is true that due to high population density of the country it will be difficult to control the disease if it passes into the third stage. But I am sure that after seeing the consequences of COVID in European countries, the population here will take precautions. It is also a good sign that in India the rate of spread of the disease is much less than in other countries.

CHAITANYA AGARWAL
VIA EMAIL



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DATA CENTRE

3 million cases globally

The number of people infected with COVID-19 in the world rose to 3,138,369 in 210 countries and territories, as of April 29, 2020. A total of 217,983 have died of the disease.

COVID-19 in India

The total number of COVID patients in India was 31,332 on April 29. There have been over 22,629 active cases, 7,696 cured/migrated patients and 1,007 deaths.

Aerosol levels lowest in decades

Aerosol levels in north India or the Indo-Gangetic Plains are at a 20-year-low for this time of the year, according to satellite data published by the US space agency NASA.

Healthcare workers at a premium

The world is short of 5.9 million nurses and 89 per cent of this shortage is in low- and lower middle-income countries, as per WHO's *State of the World's Nursing Report 2020*.

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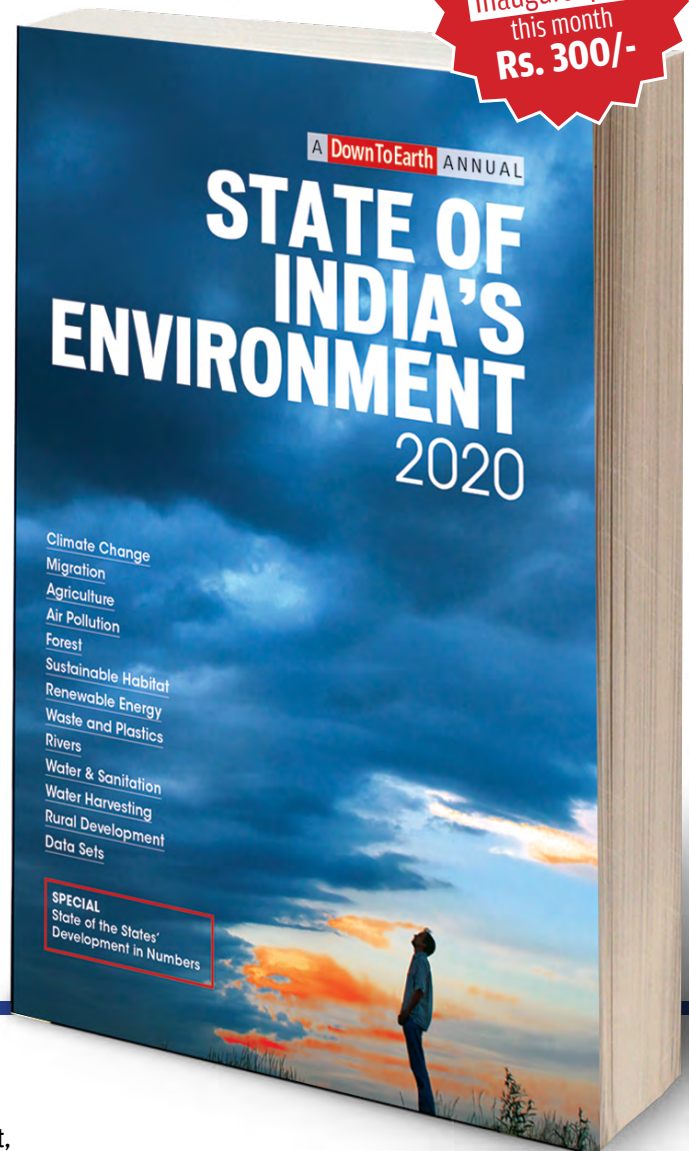
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Digest



WHAT'S INSIDE

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Odisha sarpanches get district collector's powers to fight COVID-19 **P13**

India Meteorological Department revises the country's monsoon calendar **P16**

1,000 WORDS VIKAS CHOUDHARY



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Sanitation workers and ragpickers are at high risk from unmarked medical waste generated from camps or houses where COVID-19 patients are quarantined. The Central Pollution Control Board guidelines say biomedical waste generated from quarantine camps or homes should be collected separately in yellow coloured bags and be treated as domestic hazardous waste.

A treat for environment

CHENNAI-BASED Nitin and Poonam Chordia were stunned to read news report of under-sea explorer Victor Vescovo who went 11 km down the Mariana Trench in the Pacific, the deepest oceanic point, and found a chocolate wrapper there. The couple, running a chocolate-making school in the city, decided to launch a completely biodegradable, compostable and recyclable brand. In October 2019, they launched "Kocoatrait", the world's first zero-waste and sustainable chocolate. Having sold 6,000 bars in six months, the Chordias claim to have prevented 50 kg of single-use chocolate wrappers from reaching landfills.

It's the packaging that sets them apart. The duo procure leftover cloth pieces from garment exporters in Coimbatore and collect husk waste generated while roasting cocoa. The two are boiled together in water. The finely blended pulp is passed through a sieve, the residue flattened on a handmade paper-making machine, and A4-size sheets are created to pack chocolates.

"We use water-based ink and do screen printing. Others use plastic ink, which is carcinogenic. Screen printing is a manual process, so energy consumption is zero," says Nitin. "We have employed people with special needs for printing so that they can be brought to the mainstream," he adds.

The inside of the wrapper has templates for mandala art, greeting messages and emergency contacts. The consumer can use

Chocolatiers
Nitin and
Poonam Chordia
create the
world's first zero
waste and
sustainable
chocolate brand
SONALIKA SINHA

these and then push the wrapper inside a flower pot for composting.

The first layer of packaging, however, is a problem as laws strictly say that foods cannot be packed in non-food-secure material. "We use thick, pharmaceutical-grade aluminium foil. It helps ragpickers as they can sell those and earn," says Nitin. A QR code inside the wrapper takes the user to a website that explains how the foil can be reused.

The chocolate, too, is eco-friendly. Cocoa is sourced from the organic farms of Tamil Nadu, Karnataka, Andhra Pradesh, Telangana and Kerala. During procurement, it is ensured that farmers do not lose out monetarily. "We try to get cocoa from farms closest to our factory to reduce carbon footprint," says Nitin.

Indian cocoa is not sweet. It has a slight sour taste. "That chocolate is sweet is an advertising gimmick," he says. For sweetness, non-refined *desi khand* sugar is used. Since it is unbleached and unprocessed, minerals are not lost. No artificial flavour is used in chocolate-making—to make rose chocolates, petals of the flower are ground along with cocoa and for *masala chai* variety, spices are ground. The Chordias sell the chocolates on their website kocoatrait.com, and through shops in Chennai. Their chocolate bars start from ₹190. "We wanted to set a benchmark for others to emulate. It is our contribution towards reducing the size of landfills," says Poonam.



Odisha gives sarpanches powers of district collector

RAJIT SENGUPTA

RECOGNISING THE pivotal role the decentralised governance system can play in the fight against COVID-19 pandemic, the Odisha government has delegated the powers of a district collector to sarpanches of the state's 6,798 gram panchayats for their jurisdiction. The power has been delegated under Section 51 of the Disaster Management Act, 2005 and Epidemic Diseases Act 1897 read with Odisha COVID-19 Regulations, 2020, said Chief Minister Naveen Patnaik through a video message on April 19.

As the state prepares a scientific roadmap for the return of its more

than 500,000 stranded workers post lockdown, the move will empower sarpanches to begin a registration process for those who wish to return, set up quarantine facilities at the panchayat level keeping in mind the expected arrivals and conduct community-based surveillance and monitoring. They can now take punitive actions against those who refuse to undergo the mandatory 14-day self quarantine.

The state government has allotted ₹5 lakh to each gram panchayat to carry out the processes, which experts fear is insufficient for the task at hand. "The lockdown has



left millions of workers in the informal sector without any means of sustenance. As large numbers of migrant workers continue their journey on foot and cycle, more are also likely to die because of hunger and road than from COVID-19," says Umi Daniel, director,

migration and education, at Switzerland-based non-profit Aide et Action International. Since most village households have poor water and sanitation facilities and limited access to healthcare, it would be disastrous if the coronavirus reaches there, he says.

'THE ANNOUNCEMENT IS UNCONSTITUTIONAL'

George Mathew, chairman of the Institute of Social Sciences, which promotes participatory democracy, tells **Rajit Sengupta** why the decision delegitimises the position of the elected office

How do you perceive the Odisha government's announcement?

Sarpanch is a democratically elected head of the village council who should be viewed as the "chief minister of a village". A district collector, on the other hand, is an officer who carries



out the decisions of a chief minister or the cabinet. The Odisha government, through the announcement, has given a wrong message by giving an officer's duty to an elected head. This

is unconstitutional and delegitimises the position of an elected office in our democratic system.

What role can panchayats play in times of a health crisis like COVID-19?

Panchayats should have been in the forefront during the present health crisis because the 11th Schedule of the Constitution clearly puts "health and sanitation, including primary health centres and dispensaries" under the purview of the panchayats.

Currently, panchayats in most states are marginalised and not functioning according to the Constitution of India. Little has been done by the states (except a few), to empower panchayats in the 27 years, since the 73rd constitutional Amendment which made them institutions of local self government. As a result, health centres either do not exist or are in a shambles. Disaster could be handled if people are empowered, and that can happen only through a vibrant panchayat system.

No data to show Ganga is cleaner

VIVEK MISHRA

WHILE the internet is flooded with videos and photographs on how the Ganga has become cleaner during the lockdown, there is no way to ascertain this. The Central Pollution Control Board (CPCB), responsible for collecting and updating data related to Ganga water quality on its website, does not appear to have performed the task in the past three months. This is in clear violation of the July 2018 order of the National Green Tribunal (NGT) that had asked regular monitoring of the river water quality and making the information available for people. Once again in May 2019, NGT asked CPCB and the Ganga states to provide the information on a monthly basis "indicating fitness of water at various places for drinking/bathing purposes".

While CPCB maintains two websites for the purpose, on April 23 when *Down To Earth* checked portal, Suitability of River Ganga Water (for drinking and bathing), data was available only till January 2020. The other website dedicated for real-time monitoring of 18 crucial parameters, including biochemical oxygen demand, chemical oxygen demand and water level in the river, appeared non-operational. While the website does not mention how frequently it gets updated, data displayed on April 22 and April 23 were identical for all 36 monitoring sites on the Ganga.

CPCB, however, maintains that there is nothing amiss. "Both real time and manual monitoring are happening and [data] are regularly updated on the websites," Prashant Gargava, member secretary, CPCB, told DTE. When informed that the



Madhya Ganga barrage

Suitability of River Ganga Water website shows samples were last collected in January, he said, "We have carried out a round of sampling. But some states are yet to share the data [with us]. We have written to them."

Manoj Mishra, head of the Yamuna Jiye Abhiyaan (Yamuna Forever Campaign), alleges that CPCB's real-time monitoring website is riddled with bogus data, which misleads people. The water level at one of the sites in West Bengal reads as high as 269 metres, while the permissible level is 0-5 metres. "No river in the world has this kind of water level," says Mishra. He rues that the website also does not clearly mention the methodology used or the sample size. "Sample size is crucial as pollution levels in a sample collected in a glass will be very different from a sample taken in a big water drum," explains Suresh Rohilla, senior director at Delhi-non-profit Centre for Sci-

ence and Environment. Besides, most stations provide data only for limited parameters: none provide crucial data related to chromium and fluoride levels and electrical conductivity of the water; two do not provide any data.

But air pollution drops

The apex pollution control body, however, has been closely monitoring the country's air quality through its monitoring stations in 115 cities. Between March 16 and April 15, it says, the concentration of particulate matter, nitrogen dioxide and sulphur dioxide emissions have reduced significantly in the country. While the air quality index (AQI) of 78 per cent cities was "good" and "satisfactory", compared to 44 per cent cities in the pre-lockdown phase, no city recorded "very poor" AQI. It attributes the poor air quality recorded in Delhi and nine surrounding cities on April 15 to the dust storm from the Gulf.

CROSS HAIRS SORIT GUPTO

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Ice-free summers imminent in Arctic

IN LESS than 30 years, summers in the Arctic Ocean will most likely be ice-free, and even the most ambitious carbon emissions cuts are unlikely to help, warns a new research. A team of scientists used computer models at 21 institutes from across the world to predict the grim future. They also found that slashing greenhouse gases now will only determine if Arctic summer ice vanishes permanently or recover over time. They predict that very high emissions could leave the Arctic ice-free even in the dark, cold winter months.

The Arctic is said to be ice-free when the sea-ice area drops below 1 million km². The Arctic has been one of the worst affected by climate change—it has lost 70 per cent of its ice volume since satellite records began in 1979. The ice loss has been linked to more extreme weather events, including severe winters, heatwaves and torrential floods in Europe and the US.

The last global scientific assessment of Arctic ice in 2013 predicted a complete loss of ice during September only if carbon emissions from human activities remained high.

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Reluctant game-changers

Fast-food industry has been playing a critical role in the fight against drug resistance in developed countries. Why is it dragging its feet over ending antibiotic misuse in chicken in India?

RAJESHWARI SINHA, AMIT KHURANA NEW DELHI



PHOTOGRAPH: VIKAS CHOUDHARY / CSE

LIFE WILL hardly remain the same when we get to the other side of the COVID-19 pandemic. Among the few things that are likely to remain unchanged is the popularity of fast food and the fear of a looming antibiotic apocalypse. The two are, in fact, linked.

Chicken, considered a staple on fast-food menus, are routinely administered antibiotics throughout their short lifecycle of 35-42 days, even in the absence of any clinical sign of infection. Poultry keepers say it prevents diseases while helping the birds easily gain weight with less feed. In 2014, a laboratory test conducted by Delhi non-profit Centre for Science and Environment (CSE) found residues of multiple antibiotics in chicken samples (see 'Hatching superbugs', 1-15 August, 2014). In its subsequent surveys, CSE researchers found that even poultry feed manufacturers, whether selling in open market or online, add antibiotics liberally to the feed (see 'Perpetually on antibiotics', 1-15 April, 2020). Several of these, such as erythromycin, tylosin, ciprofloxacin and enrofloxacin, belong to antibiotic classes that are critically important for humans. They are the sole or one of the limited therapies available to treat infections caused by bacteria from non-human sources. Ciprofloxacin that belongs to antibiotic class fluoroquinolone, and erythromycin that belongs to class macrolide are used in treating common respiratory and urinary tract infections. WHO categorises these classes as "highest priority critically important antimicrobials" (HPCIAS).

Any irresponsible use of these antibiotics can accelerate the emergence of resistant strains of bacte-

ria, which can then easily find their ways into the human body through direct contact with live or dead animals, consumption of meat or exposure to contaminated environment, making the person resistant to antibiotic treatment. In fact, fluoroquinolones are increasingly becoming ineffective worldwide. The impact of such growing antimicrobial resistance (AMR) is particularly huge for India, where public healthcare is highly inadequate and regulatory enforcement weak.

Fast-food industry, which is a major buyer of chicken meat in India, can be a game-changer in this fight against AMR. But a recent CSE assessment exposes their double standards for India.

Internationally, fast-food chains

FAST-FOOD INDUSTRY, A MAJOR BUYER OF CHICKEN IN INDIA, CAN BE A GAME-CHANGER IN THE FIGHT AGAINST ANTIMICROBIAL RESISTANCE. A RECENT ASSESSMENT EXPOSES THEIR DOUBLE STANDARDS FOR THE COUNTRY

are under pressure from consumers, investors and civil society to play their part in ending the misuse of medically important antibiotics for food-animal production by not using chicken raised with antibiotics. In response, they have been serving chicken raised without antibiotics in the US, Canada and some European countries for the past few years or have made commitments to eliminate antibiotics from their supply chains within a time frame. Yet, when it comes to India, these fast-food chains, mostly owned by multinational corporations, are vague about their reduction or elimination frameworks and

time frames. Worse, there has been little improvement in their practice since CSE did its first survey and exposed their double standards.

DOUBLE STANDARDS ON

In 2017 when CSE researchers reached out to leading fast-food brands in India to assess their commitment towards reducing or eliminating antibiotics from the chicken supply chain, most had no plans or vague elimination frameworks. The list included brands run by multinationals that were already performing responsibly in other countries. Jubilant FoodWorks Ltd (JFL) which holds the franchise for Domino's Pizza and Dunkin' Donuts in India was the first one to release its policy on the "usage of antibiotics in poultry birds' health management" soon after CSE started discussing the parochial attitude of fast-food giants. Two years later, when CSE revisited the industry, JFL was still the only one with India-specific policy.

In its latest assessment, conducted during the last three months of 2019, CSE researchers wrote to 11 companies managing 14 fast-food brands in India. These include nine foreign multinationals operating 12 brands and two Indian multinational brands managed by domestic companies. The researchers asked the companies if they have any existing India-specific policy or future plans for reducing or eliminating the use of antibiotics in chickens they source and if they have any policy to test the sourced chicken meat and their food products for the presence of resistant bacteria and antibiotic residues. Only five of the 14 responded.

Eight of the nine brands that did not respond are foreign multi-

Ungolden silence

9 of the 14 brands did not respond to queries on antibiotic use in supply chain; 8 are foreign multinationals

GLOBAL POLICY, COMMITMENTS FOR COUNTRIES OTHER THAN INDIA	POLICY AND COMMITMENT GAPS FOR INDIA
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Pizza Hut, KFC, Taco Bell
Run by **Yum Restaurants India Pvt Ltd**

- ▶ Yum! Brands has a global antimicrobial stewardship policy
- ▶ Pizza Hut US eliminated antibiotics from chicken in pizzas in 2017; to eliminate from chicken-wings by 2022
- ▶ KFC US eliminated antibiotics from its chicken supply chain by 2018
- ▶ Taco Bell US achieved this by 2017

- ▶ Neither Pizza Hut nor Taco Bell provide any public commitment and timeframe to eliminate antibiotic misuse from supply chains in India
- ▶ KFC too has no such commitment. But claims that its sourced chicken is free from antibiotic residue; suppliers follow WHO norms and use antibiotics approved for veterinary or dual use



Chili's India
Run by **Tex Mex Cuisine India Pvt. Ltd.**

- ▶ Parent company Brinker International committed to eliminate antibiotics from supply chain in US. As of 2019, over 60 % chicken served in US is raised with no antibiotics

- ▶ No public commitment or time frame to reduce or eliminate the misuse of antibiotics from supply chains in India



Burger King
Run by **Burger King India Pvt. Ltd.**

- ▶ Parent company Restaurant Brands International committed to eliminate antibiotics from supply chain in US and Canada by 2018-end

- ▶ Claims chicken are grown under supervision of trained farmers, does not talk about antibiotic use at farm level; no commitment to eliminate its misuse



Starbucks
Run by **TATA Starbucks Pvt. Ltd.**

- ▶ Eliminated routine antibiotic use in poultry served in US stores since 2018

- ▶ No public commitment, time frame issued to eliminate antibiotic misuse



Wendy's India
Run by **Sierra Nevada Restaurants Pvt. Ltd.**

- ▶ Has animal antibiotic use policy in place; eliminated use of antibiotics from chicken production in the US in 2017

- ▶ No public commitment, time frame issued to eliminate antibiotic misuse



Costa Coffee
Run by **Devyani International Ltd.**

- ▶ Website doesn't provide information. Previous owner Whitebread PLC committed to reduce HPCIA use, and all antibiotic use for disease prevention

- ▶ No public commitment, time frame issued to eliminate antibiotic misuse



Café Coffee Day
Run by **Coffee Day Enterprises Limited**

- ▶ Indian brand; doesn't have a global policy.

- ▶ No public commitment, time frame issued to eliminate antibiotic misuse

Note: Claims as per websites of the brands or their parent companies, annual reports and publicly available documents; Antibiotics refer to all those used in humans

nationals with either global overarching policies encouraging responsible antibiotic use in animals or have eliminated antibiotics from their chicken supply chains in the US (see 'Ungolden silence').

Consider Pizza Hut, Kentucky Fried Chicken (KFC) and Taco Bell. These are managed by America's Yum! Brands, a Fortune 500 corporation. It has a global antimicrobial stewardship policy that focuses on responsible and judicious antimicrobial use. All the three brands have removed antibiotics important to human medicine from their poultry supply chains in the US. But with no response received and no information on public domain, these brands do not seem to have any India specific plan or commitment to eliminate or reduce antibiotic misuse in supply chains.

KFC on its India website, under the "Frequently Asked Questions", says, "Chicken supplied to KFC India is free from any antibiotic residue, as our chicken supplies are subjected to a withdrawal period specific to each medicinal treatment. Additionally, our poultry suppliers follow the standards set by WHO and only use antibiotics that are approved for veterinary use or dual use." But focus on eliminating antibiotic residues is only half of the solution. It should be on eliminating antibiotic use at farm level. Moreover, the use of antibiotics approved for dual use is not the best practice.

Besides, KFC's statement on its India website is different from what it says on websites for other countries. On its UK website, KFC mentions not allowing the use of growth promoters and antibiotics for disease prevention in raising chicken whose meat they procure. On Australia website, it claims to be following all laws and regulations related

to judicious antibiotic use outlined in Yum! Brands' policy and is working with suppliers to reduce the use of antibiotics important to human medicine in its chicken supply.

Similar is the approach of Wendy's, a popular US-based burger chain. It has played a pioneering role in reducing antibiotic misuse in the US and has an "animal antibiotic use policy" in place since 2006. By 2017, it eliminated the use of all medically important antibiotics from its supply chains in the country. When approached by CSE, Wendy's India refused to divulge information. Usman Moin, manager-supply chain, Wendy's India wrote: "The information being asked falls under the confidentiality clause that has been agreed as a part of master license agreement with the brand and hence cannot be shared".

Café Coffee Day (CCD), a popular coffee chain in India that serves chicken based dishes, also did not share its plans for eliminating antibiotic use in supply chain.

REST OFFER LOW RELIEF

All the four multinationals and one national brand that responded to CSE's queries, recognised AMR as an area of concern. But it appears from their responses that their efforts are nowhere closer to what their counterparts have achieved in other countries. Only one has a clear elimination strategy for India (see 'Half-hearted effort').

McDonald's, the world's largest fast-food chain, has stopped serving chicken treated with antibiotics important to human medicine in its restaurants in the US since 2016. It has also eliminated the use of HPCIA in broiler chicken for Brazil, Canada, Japan, South Korea, US, Australia, Russia, China and Europe. Responding to CSE's queries,

Half-hearted effort

4 of 5 brands, working towards reducing antibiotic misuse, are owned by foreign multinationals, but the pace is too slow

GLOBAL POLICY, COMMITMENTS



McDonald's

Run by **Hardcastle Restaurants Pvt Ltd (west, south India)**

- ▶ Has global vision for antibiotic stewardship in food-animals
- ▶ Since 2016, no chicken served in US treated with antibiotics; committed to eliminate HPCIA use for several countries by 2019

EXISTING POLICIES, PLANS FOR INDIA

(Excerpts from responses to CSE)

- ▶ Antibiotics not used for growth or prophylaxis; used only for treatment as prescribed by vets. High standards for farm biosecurity, hygiene, husbandry and controls, and best practices adopted so that need for antibiotics is reduced. Periodic antibiotic residue testing is done in meat
- ▶ **Gaps:** No public commitment and time frame to eliminate antibiotic misuse in India. Its response to CSE doesn't mention HPCIA use which is being eliminated across several countries. Did not share laboratory reports on testing of antibiotic residues in sourced meat, nor does it talk about resistant bacteria



Subway

Run by **Subway Systems India Pvt Ltd**

- ▶ Has in place global responsible use of antibiotic policy
- ▶ Committed to serve chicken raised without antibiotics in the US by 2016-end

- ▶ Committed to provide safe, sustainable food. Says responsible stewardship in farm animal raising is a critical component of responsible sourcing. Working with suppliers worldwide to align sourcing standards with WHO norms
- ▶ **Gaps:** Does not have public commitment and time frame for elimination. Did not disclose lab reports on resistant bacteria, antibiotic residues



Domino's Pizza and Dunkin' Donuts

Run by **Jubilant FoodWorks Ltd**

- ▶ Domino's Pizza sells chicken free of antibiotics in US; no purchase of chickens raised with fluoroquinolones. In UK, it does not permit antibiotic use for growth promotion, recommends minimising HPCIA use
- ▶ Dunkin' Brand: Policy says US restaurants will serve chicken raised with no antibiotics since 2018

- ▶ All chicken products sourced from authorised processors, who source raw meat from routinely monitored JFL enlisted farms with environment control. Agreement with enlisted farms on no non-therapeutic antibiotic use. Farm surveillance by vets to track bird rearing practices and bird health care programs. All farms adhere non-usage of HPCIA guidelines; many practicing "no antibiotics ever" policy. Conducts periodic testing of antibiotic residue in meat
- ▶ **Achievement:** First fast food company to come out with an India-specific policy for elimination of antibiotic misuse



Barista

Run by **Barista Coffee Company Ltd.**

- ▶ Indian brand; does not have overarching global policy

- ▶ Vendors supply antibiotic-free chicken meat. All birds checked by vet before slaughter, treated with high standards; nil antibiotic usage advised. All birds have access to carefully formulated feed, clean water, space and veterinary attention
- ▶ **Gaps:** Antibiotic-free does not mean antibiotics are not used in farms. Response is based from one supplier; does not reflect country status. No public commitment/timeframe to reduce or eliminate antibiotic use. Test reports not shared

Note: Claims as per websites of the brands or their parent companies, annual reports and publicly available documents; Antibiotics refer to all those used in humans

Hardcastle Restaurants Pvt Ltd (HRPL) that operates over 300 McDonald's outlets across west and south India, said that it does not use antibiotics for growth promotion or disease prevention. "Such antibiotics are used strictly in accordance with labelled and veterinary direction for dose, duration, route, frequency, withholding period and withdrawal times. Appropriate withholding periods ensure that there is no antibiotic residue in the chicken," it notes.

Though McDonald's antibiotic use policy for broiler chickens has a time frame for eliminating HPCIAS used in all the other designated markets worldwide by 2027, the list does not mention India. While HRPL said the policy applies to India, its response does not mention HPCIAS. It also did not share laboratory reports on testing of antibiotic residues in sourced meat, despite referring to a periodic and comprehensive testing programme to ensure zero residue, nor did it specify monitoring of resistant bacteria in the sourced meat.

Subway India, which has about 660 outlets and provides some 26 chicken dishes in its menu, in its response said it has a "global responsible use of antibiotics policy". "We are working with our suppliers across the globe to align sourcing standards with WHO recommendations," said Ranjit Talwar, country director (South Asia), Subway Systems India Pvt Ltd. However, it is not clear from the response whether Subway, which has been serving chicken raised without antibiotics in the US since 2016, has any specific commitment for India. It also did not disclose about testing for resistant bacteria and antibiotic resi-

dues in chicken meat. In its 2017 response to CSE, Subway mentioned working on possible transition plans for each region, including India. It seems this is yet to happen.

Barista, the oldest coffee house chain in India which also offers chicken dishes, shared that its suppliers have been advised about nil antibiotic usage and supplying antibiotic-free chicken. This, however, does not negate the possibility of antibiotic use in supply chain. Moreover, its response was based on the feedback from only one of its suppliers which does not reflect the practice followed across India. It also did not provide any laboratory or audit reports to back up its claims.

JFL is the only company that

MCDONALD'S DOESN'T SERVE CHICKEN TREATED WITH ANTIBIOTICS IN USA, HAS ELIMINATED USE OF HIGHEST PRIORITY CRITICALLY IMPORTANT ANTIMICROBIALS FOR OTHER COUNTRIES. BUT YET TO MAKE SUCH COMMITMENTS FOR INDIA

could provide laboratory evidence to show that its raw chicken samples are devoid of antibiotic residues. Avinash Kant Kumar, executive vice president, JFL, says, "It has been a difficult journey as the [poultry] industry was not ready for our tasks on this front two years ago. However, our persistence has paid off." Kumar is referring to the company's policy, which requires poultry keepers to first eliminate the use of antibiotics for growth promotion and group-level disease prevention by 2018; end HPCIA use by 2019; and limit the use of CIAS to the second line of treatment in birds. Though JFL claims to be on track in

implementing its policy, the company is yet to publicly announce it.

TIME TO ACT IS NOW

The fast-food industry in India appears to be reluctant to come out with their commitments and time frames for addressing the issue of antibiotic misuse in the supply chain despite the fact the country's National Action Plan for AMR, released in April 2017, highlights the role of the food industry in containing AMR. Delhi, in its action plan to fight AMR, has particularly called on select fast-food industry players to commit to eliminate antibiotic misuse in their supply chain.

CSE researchers say it's time the industry issued time-bound public commitments specific to India to eliminate non-therapeutic use of all medically important antibiotics, and use of HPCIAS for treatment in their supply chains. It should aim to achieve these commitments like their international counterparts and share progress periodically in the public domain along with third-party sup-

ply chain audits and laboratory testing reports on antibiotic residues and resistant bacteria. The Food Safety and Standards Authority of India which now provides tolerance limits for antibiotics in food, including chicken meat, must also monitor these products.

Unless the animal aspect of AMR is addressed effectively, it would be difficult to deal with the burden of antibiotic resistance growing day by day. [DTE](https://www.dte.org.in) [@down2earthindia](https://twitter.com/down2earthindia)

(The authors work with Food Safety and Toxin unit of Centre for Science and Environment, New Delhi. They thank Divya Khatter for her support)

Silence grips forest

Communities and traders fail to earn from non-timber forest produce despite exemption from lockdown rules

ISHAN KUKRETI
NEW DELHI

ACROSS THE central India, mahua trees are in full bloom. Revered as the “tree of life” by tribal communities, their flowers signal the start of a four-month season when forests generate the much-needed cash for the country’s 300 million people, living at the bottom of the socioeconomic ladder, and a hectic schedule for traders, processors and exporters. Lucrative produce like tendu leaves, sal seeds, bamboo and lac, become available only during this period, and get the country’s ₹20,500 crore-a-year forest-based economy going. “But this time the market is com-

pletely stagnant,” says Mayank Agarwal of Shree Vinayak Enterprises, a lac processor and exporter in Purulia district of West Bengal. Purulia is a major lac manufacturing and exporting hub in the country. On April 16, soon after extending the 21-day lockdown to 40 days to contain the spread of coronavirus, the Centre exempted collection and trading of lac and other non-timber forest produce (NTFP) from the rules. “It has been 10 days since the announcement. Yet I have not received any fresh raw material,” says Rakesh Gupta of Ganesh Lac Udyog in Kolkata that primarily

PHOTOGRAPH: PURUSHOTTAM SINGH THAKUR

RELATED STORY

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The lockdown coincides with the peak season for collection and harvest of several non-timber forest produces

caters to the domestic market. "This is because policies take time to translate into action in an unorganised industry like lac," he adds. Agarwal, however, says he is not in a position to buy fresh lac even if they arrive. "I have not been able to sell my stocks as most of my clients are in countries like the US, China and Spain that are badly hit by the pandemic," says Agarwal.

NTFPs like lac are in high demand from pharmaceutical and cosmetic sectors, among others, and a substantial share of the commodities are exported. In 2018-19, India exported ₹473.9 crore worth of lac, as per the Ministry of Commerce and Industry. However, all international trade has come to a grinding halt since February when the pandemic spread in multiple countries.

The other such commodity is tree-oil extracted from seeds of mahua, sal and several other NTFPs. Cosmetics and confectionary industries are the biggest consumers of the oils. "Tree-oil exports have reduced by 40 per cent and we are not sure when this market will reopen. We are now surviving on the domestic market which is also shrinking fast," says Swapnil Patil of Raipur-based Manorama Industries that manufactures and supplies exotic and specialty fats and oils.

The impact is also palpable on sectors like handicrafts. "We have an unsold inventory of over ₹100 crore," says Pravir Krishna, managing director at the Tribal Cooperative Marketing Development Federation of India. The lockdown has also led to the cancellation of India's largest handicrafts fair, the Export Promotion Council for Handicrafts, to be held from April 15 to 19. There are about 300,000 families involved in the production of

handicraft and handloom items in the country. "We have decided to buy the unsold items and have set aside ₹500 crore for it," he adds.

AT RECEIVING END

But not all are as fortunate. Most collectors feel the heat of market stagnation as several NTFP commodities are highly perishable. Lac, for example, is temperature sensitive. Once collected, it has to be kept in cold storage within a day. Or else, it turns into a solid unusable mass. "With markets and transports closed, people are not able to sell lac," says Beni Puri, a Chhattisgarh-based researcher with non-

profit Oxfam India that works on livelihood issues.

Dasarathi Behera of Kalahandi-based awareness group Odisha Jungle Manch too cites an instance. Before the lockdown, the residents of village Dharmagarh had received an order for bamboo from a trader in Puri. "They have gathered the required volume. But the trader is not able to arrange a transporter for carrying the goods," he says.

Another impact of the lockdown has been a crash in NTFP prices. Mahua flowers, for example, were expected to fetch a higher price this year as untimely rains in March had reduced yield. "But due to the

Grinding to a halt

The current lockdown has hit the market for all non-timber forest produces except tendu



Lac

100%

drop in market
in past three
months

April-June

Peak collection
seasons

3 million

People
dependent



Mahua

50%

drop in market
in past three
months

April-May

Peak collection
seasons

56 million*

People
dependent



Tendu

0%

drop in market
in past three
months

April-June

Peak collection
seasons

7.5 million

People
dependent



Sal seeds

40%

drop in market
in past three
months

April-June

Peak collection
seasons

30 million

People
dependent



Bamboo

NA#

drop in market
in past three
months

April-May

Peak collection
seasons

10 million

People
dependent

Not available

*Over 75 per cent of tribal households in Odisha, Madhya Pradesh and Andhra Pradesh collect mahua flower and earn ₹ 5,000 a year

Source: Tribal Cooperative Marketing Development Federation of India and discussions with traders and experts

lockdown, very few traders are coming forward. Now its prices have plummeted by over 30 per cent to just ₹10 a kg. Volume of the trade has also come down,” says B B Panda of Foundation for Ecological Security, a non-profit that works on issues of livelihood. Many who have collected mahua despite the hardship are not able to sell it, he adds.

It's unfortunate that the lockdown has coincided with NTFP collection period, says Chittaranjan Pani, coordinator for MFP Group, a national level forum on sustainable forest-based livelihood. Earning during these three to four months cater to their needs up to winter season and particularly in the rainy season when employment is hardly available for them, Pani says.

NTFPs account for 20-60 per cent of the income of India's 300 million forest dwellers, says a 2011 Planning Commission working group paper. The produce is the only source of income for more than 600,000 people who live in forest villages and do not have a ration or Aadhaar card to benefit from the government's direct cash transfer or food relief through public distribution system.

The impact can be clearly seen on ground. In Chhattisgarh's Gariahat district, Kamar tribal families depend on bamboo, whose harvesting starts in April and continues till the onset of monsoon around June 15. Puri says each Kamar household earns about ₹600 a week by selling bamboo and bamboo products like broom and baskets. “With markets closed, they are now without income. Under the pandemic relief programme, the state government has provided them with two months worth of rice

and salt. They are now surviving on that,” he adds.

Though most households have received ₹500 in their Jan Dhan accounts under the government's pandemic relief package, most villages do not have banks or ATMs in their vicinity. “Besides, they would want to preserve the cash to buy inputs for the upcoming kharif season as there is no other earning now,” says Sreetama Guptabhaya, program coordinator, natural resource management, Oxfam India.

SHIELDED FROM CRISIS

Tendu is the only NTFP that appears to be enjoying a stable market as it is mostly nationalised and the collection process is institutionalised, says Guptabhaya. Forest Development Corporations collect tendu leaves through village-level collec-

SUBSTANTIAL NTFPS LIKE LAC AND TREE-OILS WERE EXPORTED TILL INTERNATIONAL TRADE WAS SUSPENDED IN FEBRUARY. MANUFACTURERS SAY THEY NOW DEPEND ON DOMESTIC MARKET WHICH IS ALSO SHRINKING FAST

tion centres and directly pay the collectors. At places, where gram sabhas deal with traders, they enter into contracts with them and receive payments in advance. “We sell tendu to our fixed traders,” says Dilip Gode, a community leader in Gadchiroli district of Maharashtra who is active in tendu trade. Gadchiroli is one of the few places where gram sabhas sell the leaf on their own. Gode says tendu leaves can be stored for over six months. “As a result, the *beedi* industry which is closed during the lockdown, is willing to buy and store the leaves,

which is seasonal,” he says. Only its exports to Sri Lanka, Bangladesh and West Asia have stopped.

The Centre during the lockdown has urged state governments to rely on two schemes to ensure that communities receive fair price for NTFPs: the minimum support price for minor forest produce (MSP for MFP) and the Pradhan Mantri Van Dhan Yojna (PMVDY). But neither has sufficient reach or mechanism to provide any meaningful respite.

MSP for MFP, launched in 2013 to ensure fair price, has practically become defunct over the years, says Pani. Though the scheme recognises 50 NTFPs, till date only 23 have the fair average quality parameters needed for procurement. The scheme has never exhausted its budget since inception. In 2014-15, the Centre spent ₹100 crore, which was less than a third of the scheme's allocation. “The Centre has not released data on the scheme since 2015-16, highlighting its casual approach towards the scheme. The procurement centres at the state level are also limited,” he adds.

The situation is no different for PMVDY, launched in 2018 with the mandate of creating 6,000 self-help groups in forest villages that will empower the residents to process NTFPs and fetch better prices. “It has been implemented only in a few pockets and lacks the scale required for the current crisis,” says Y Giri Rao of Vasundhara, a Bhubaneswar-based non-profit that works for development of tribal communities.

It seems, forest dwellers could have been shielded in the current crisis had the government implemented NTFP schemes in earnest in the past. But as they say, it's never too late. **DTE**  @ikukreti



Children play at an empty square in downtown Ronda, Spain, accompanied by their guardians as the government de-escalates six weeks of strict lockdown, despite over 24,000 deaths and 213,000 infections



ANOTHER CURVE

The world witnesses a rare urban-to-rural exodus amid lockdowns and loss of livelihoods. Will our villages be able to support the millions of people again who had migrated due to distress conditions at home?

BY RICHARD MAHAPATRA

FOUR MONTHS into the COVID-19 pandemic, the world is at a crossroads. On the one hand the virus continues to appear in newer places, infecting thousands every day and forcing countries to extend their lockdown. But on the other hand, those already under COVID-19 lockdown for over six weeks in India are desperate to break free and resume economic activities at the earliest as millions have already lost livelihoods. And, as they ready to be out of this unprecedented situation, the world witnesses another challenge: a never-before-experienced exodus of people from economically active urban areas into their already distressed rural homes. They also carry back the threat of COVID-19 to areas that have so far remained untouched by the pandemic. In May, the pandemic will show its other deadly side.

On April 26, Spain allowed children under 14 to venture out though with stringent guidelines. They can go out for an hour in a day; they must be accompanied by parents or guardians; they must remain within one kilometer of their residence; and they must adhere to social distancing mechanisms. They will stroll only as parks and playgrounds remain closed. Still, as television channels beamed, there

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were smiling faces. As one parent said, after a lockdown of 40 days, small joys like feeling the fresh air on the face made it appear like a rebirth. And this is despite the 24,275 deaths and 213,000 infections as on April 30, which have transformed this European country known for tourism into a graveyard of despairs. The country is finally limping back to normalcy. From May 2, adults would also be allowed to exercise and stroll outside. The epidemiological curve has been flattened in Spain, and would soon be squashed going by experts.

Now, all top five countries in terms of infection and human mortality are on their way to loosen the lockdown. Starting from China—the origin of SARS-CoV-2, as the virus is known—to the US to Germany, Italy and Spain, there are plans to allow normal human movement, though in a staggered way. The US—with the highest number of cases of COVID-19—has also announced exit plans for lockdowns in states (see infograph ‘Death spree’ on p29). In Germany, the government has formed a 26-member group of philosophers, scientists, historians, theologians and legal experts to start the process of lifting the lockdown. But it has been cautious to do so in one go. Rather, its strategy is to gauge the social and economic impacts of a prolonged lockdown and how communities would endure it. India has allowed certain business activities with low-staff attendance and the Union government has opened its offices. Inter-state migrant workers and students have been allowed to move to their respective states.

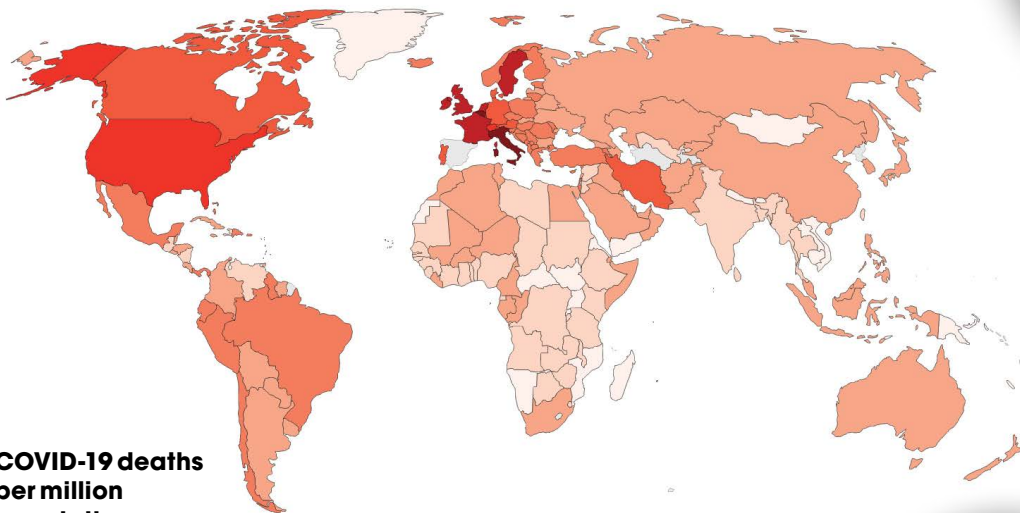
Certainly, our endurance with the pandemic has taken a different curve. However, as governments discussed these exit plans sensing that the infection is finally peaking—as after the peak, the infection falls away—there were developments across the world that indicated how challenging the situation would be post the lockdown.

There were protests against lockdowns, with a common demand: restore business to save lives. In India, stranded migrant workers in Gujarat and Maharashtra took to streets protesting non-availability of food and basic facilities and demanded return to their states. By this time, key states like Uttar Pradesh, Odisha, Rajasthan, Bihar and Jharkhand had put in place elaborate plans to not only bring the workers back but also to create quarantine facilities for them before they enter villages. Barring the ruling party, most other political parties supported lifting of the lockdown and allowing economic activities, though with restrictions necessary for curtailing the infection.

In the US, there were anti-lockdown protests across the states. Reportedly, these protests were encouraged by President Donald Trump, who has been staunchly against a nationwide lockdown. In the Polish-Germany border area of Saxony on April 29, commuter workers protested against the over six-week lockdown. It is estimated that some 10,000 Polish travel to neighbouring German towns every day for work but have been kept away from work due to the lockdown. “Let us work, let us home,” read a protester’s banner. South Africa reported food riots in West Cape areas

DEATH SPREE

Belgium has the highest COVID-19 death ratio per million people at 647, followed by Spain (519) and Italy (457). The world average is 29



COVID-19 deaths per million population

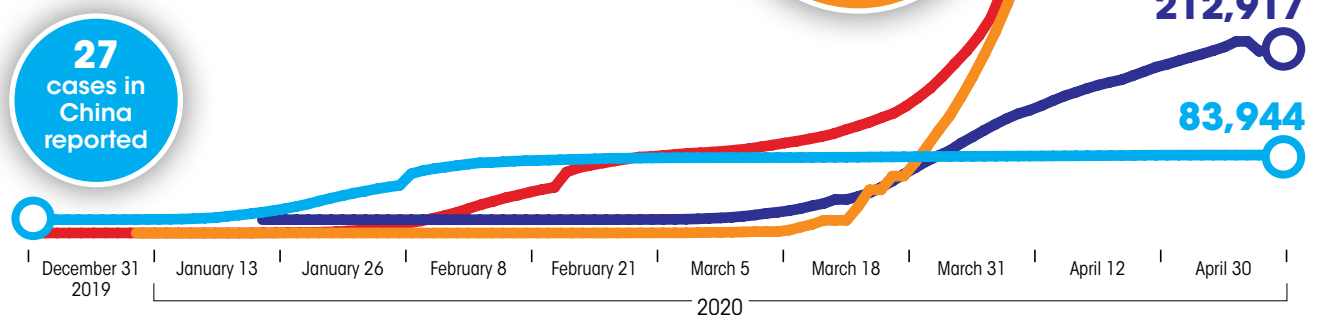
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Africa	Asia	America	Europe	Oceania
34,743 cases	502,955 cases	1,293,607 cases	1,288,663 cases	8,136 cases
1,591 deaths	18,203 deaths	74,591 deaths	132,543 deaths	116 deaths

696 cases have been reported from an international conveyance in Japan 7

Source: European Centre for Disease Control and Prevention

- World COVID-19 cases
- Spain COVID-19 cases
- China COVID-19 cases
- USA COVID-19 cases



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GRAPHIC: SANJIT / CSE

and Johannesburg. Police had to fire at anti-lockdown protesters. Food stores were raided. In Malawi, the country's apex court struck down a nationwide lockdown as people protested against it citing total collapse of livelihoods. This is the first African country where the judiciary intervened to lift a lockdown.

Meanwhile, the [International Labor Organization \(ILO\) has updated its estimate on livelihood loss](#). It says half of the global workforce who are also informal workers would lose livelihoods in immediate terms. It means some 1.6 billion informal workers, more than the population of the world's second most populous country India, would be without jobs. In March, about 2 billion informal workers lost almost 60 per cent of their wages. With such meager income which might not be adequate for a few days of basic survival, they faced an imminent loss of work in April and a situation of zero-income. "For millions of workers, no income means no food, no security and no future. Millions of businesses around the world are barely breathing," says Guy Ryder, director-general of ILO, adding, "They have no savings or access to credit. These are the real faces of the world of work. If we don't help them now, they will simply perish."

In Asia and Africa, several countries were going through an economic slowdown or just recovering from other crises when COVID-19 hit them. Like in India, the economic growth rate was the slowest in 11 years while unemployment among informal workers was very high. Though Africa was recording a relatively better economic growth, several countries were under stress. Take the case of West African countries, Burkina Faso, Mali and Niger. The Food and Agriculture Organization (FAO) warns that at least 5.3 million people will face extreme hunger in these countries. Alarming levels of internal conflicts, insecurity and an early lean season affecting agro-pastoral activities are touted to be responsible for an unprecedented displacement and food insecurity in these countries. In the [2020 Global Report on Food Crises](#), released on April 21, the UN body warns about acute food insecurity in these countries due to increased violence, displacements and disrupted agriculture and trade. Nearly 1.2 million people have already been displaced by internal conflict and violence in these countries. FAO predicts that more are likely to be displaced over the next three months if current levels of insecurity persist. Their ordeal does not end here. To contain the pandemic, the three countries have adopted measures such as closure of borders and restriction on markets. These measures have impacted pastoral areas as well, says Coumba Sow, FAO resilience coordinator for West Africa. Movement of herders and livestock has been restricted due to the closure of international borders. In early April, the Food Crisis Prevention Network had expressed concerns regarding COVID-19-related risks such as collapse of food crop production, impact on pastoralists and a lack of food availability.

The situation is no better in India. In the days immediately after the



nationwide lockdown was imposed on March 25, we witnessed the desperate migrant workers returning homes. Now, at least 10 states have crafted elaborate strategies to get at least 11 million migrant workers back to their villages. The relief packages of the Union government and various states have put feeding people, ensuring a livelihood security for a few months and access to immediate health facility at the core. In India, inter-state migration for work is common, accounting for 43 per cent of the total work-related rural-to-urban migration. These migrants are also heading to villages, besides the inter-state ones. But how would they be absorbed for productive livelihoods?

It is the time of harvesting rabi crops and beginning of the new crop cycle. Both are labour- and capital-intensive. But the agriculture sector's capacity to create employment and generate income has saturated in the country. During the monsoon season, activities across the construction sector too remain subdued, failing to absorb more employment-seeking people. This means, villages will soon get flooded with people searching for livelihoods but without any hope of getting so. It would be a rare sight for India and, for that matter, several other developing countries where millions who had left villages due to one distress are returning home due to another. In both the situations, inequality in development and distribution of wealth, created from economic boom in all these decades, are responsible for pushing the economically deprived people further into distress.

In this pandemic, the world has learnt two lessons at a deadly cost. First, we did anticipate the pandemic but never bothered to follow it up with the level of preparedness required to prevent it. Second, a health emergency without a precedent doesn't have to be tackled with a clinical approach. The pandemic is now a global development challenge that is yet to be fathomed for a future strategy to tide over it. In both these lessons, there is a realisation: inequality is a much bigger catalyst, which has the power to convert a health emergency into a long-term development problem. [DTE](#) [@richiemaha](#)

PREVIOUS EDITIONS ON COVID-19

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THE BIG PHARMA MESS

The pandemic has exposed a serious fault line in the global pharmaceutical supply chain, created by an industry that flourished by putting profit before public health. Amid shortage of life-saving drugs, countries now scramble for self-sufficiency. But circumventing market dynamics may not be easy

VIBHA VARSHNEY AND KUNDAN PANDEY

In February-end, when the United States confirmed 60 cases of the coronavirus disease (COVID-19), President Donald Trump dismissed it. “This is like a flu,” he said. Within weeks, the US had 0.2 million cases and the number of deaths crossed that of the 9/11 terrorist attacks in 2001. A grim-faced Trump now called the contagion “vicious” and to tackle the unprecedented crisis, the US scrambled to get life-saving medical supplies by hook or by crook. In India, Tamil Nadu had ordered 0.4 million rapid test kits from China to tackle a sudden spurt. The consignment was to reach the state on April 9, but Washington, in all likelihood, put pressure on Chinese manufacturers and the kits were swiftly diverted to the US.

Like the US, all nations are scurrying for medical supplies and they are ready to play dirty. With close to 3 million people hit by COVID-19 globally and over 0.2 million dead, pharmaceuticals have turned out to be the most vital sector. It’s about national security, say countries, and each wants to reduce its dependence on foreign supplies. On March 25, for instance, when the coronavirus, SARS-COV-2, was spreading rapidly, the European Union included

health, medical research and biotechnology as part of its “restrictive list” of foreign investment. Italy was then the worst affected after China and begged EU member nations for face masks. Instead of offering help, Germany and the Czech Republic promptly banned export of masks and other protective equipment. Germany intercepted a truck, on way to Switzerland with 240,000 masks, before it left German soil. Turkey and Russia followed suit.

As deep cracks appeared in the global supply chain of masks, personal protection equipment (PPE), testing kits, drugs and ventilators, this has triggered infighting within countries. In the US, the federal government has seized masks, thermometers and other essentials ordered by different states. In France, the government has requisitioned all available masks for its own use. Israel has deployed its intelligence agency, Mossad, to take control of all ventilators in the country. Worldwide, there is a demand for at least 880,000 ventilators. Germany has 25,000 ventilators with 10,000 more on way, but the country is unwilling to share it. NITI Aayog on April 3 estimates that India would need 27 million N95 masks, 15 million PPE, 1.6 million diagnostic kits and

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CHINA AND INDIA

97%
OF ANTIBIOTICS
IN THE US COME
FROM CHINA

90%
OF VITAMIN C
IN THE US COMES
FROM CHINA

90%
OF THE BULK
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CHINA AND INDIA



50,000 ventilators within two months.

India has further been pushed into the eye of the storm with experimental drugs like hydroxychloroquine (HCQ) becoming part of the politics. As stocks of active pharmaceutical ingredients (APIs)—basic therapeutic chemicals that act as raw materials for producing tablets, capsules and syrups—dwindled globally, India put 13 APIs, also called bulk drugs, and their formulations on the restricted list for exports on March 3 and then banned their export on April 4. These accounted for 10 per cent of India's total pharma export.

The anti-malarial HCQ was part of the list. But India was forced to lift the ban on humanitarian grounds. The US, in fact, threatened India with retaliation. On April 6, India's Directorate General of Foreign Trade (DGFT) had to permit export

of APIs and formulations made from them. Export of formulations made from paracetamol were also allowed, though DGFT continues to restrict export of the API for paracetamol. This medicine for fever is part of the arsenal to provide relief to COVID-19 patients.

The pharmaceutical industry has developed in a way that makes every country vulnerable during crisis, says Ashok Madan, executive director of Indian Drug Manufacturer Association. As every country scrambles for medical essentials, it has enormously strained the global supply. At the same time, the scramble has also exposed a faultline in the global supply chain, created over the years by an industry that has flourished by putting profit before public health. With bulk of the production of

pharmaceuticals and medical essentials occurring only in China and India, global reliance on these countries is overwhelming.

THE API CRISIS BIGGEST DRUG PROVIDERS TO THE WORLD LOCKED DOWN

Developed countries make APIs only for patented drugs. It is left to India and China to produce APIs for generic drugs. The US imports 80 per cent of the APIs from the two countries. China is the biggest player. It provides 97 per cent of the antibiotics and over 90 per cent of vitamin C used in the US. In 2018, 95 per cent of ibuprofen, 91 per cent of hydrocortisone, 70 per cent of acetaminophen and 40-45 per cent of heparin in the US was procured from China. Similarly, some 90 per cent of the APIs for generic medicines in the EU were sourced from India and China, indicates a paper prepared in March for the EU pharmaceutical committee.

According to UK's Medicines and Healthcare Products Regulatory Agency, China manufactures around 40 per cent of all APIs used worldwide although the World Health Organization (WHO) puts this figure at 20 per cent. The China Chamber of Commerce for Import and Export of Medicines and Health Products says the export value of Chinese APIs in 2018 was US \$30.48 billion and the export volume reached 929.72 million tonnes.

The reason for Chinese supremacy in API manufacturing is because when the sector first developed in China, it was state-owned. The government strategically supported the industry and gave them incentives such as cheap electricity, water and labour, negligible financial costs and no charge on land; it also established special industrial zones. "In the late 1980s, when global corporations started shifting their production base to developing countries, their interest was to get cheap labour and raw materials in an effort to maximise the benefit," says K M

Gopakumar, legal advisor and senior researcher with Third World Network, an international research and advocacy organisation. China emerged the winner and managed to kill India's existing pharmaceutical sector. "For example, China dumped cheap Penicillin G in India, outperforming Indian manufacturers like Hindustan Antibiotic in the public sector and Torrent Pharmaceuticals Ltd, Alembic Pharma, Southern Petrochemical Industries Corporation Ltd and JK Pharmachem in the private sector," explains Madan of the Indian Drug Manufacturer Association.

With the pandemic, China had to lock down its production hub in Hubei province, which hit hard its supply to the world. The region has 44 companies which are either approved by the US Food and Drug Administration (FDA) or meet EU standards. These units have been shut since January 24.

Unlike China, India is more involved in producing finished products. The country is the world's largest provider of generic medicines, accounting for 20 per cent of global generic drug exports in volume terms. Small wonder, India is also called the "pharmacy to the world". In response to a Rajya Sabha question, the government said on March 13, 2020 that India exported medicines worth \$14,389 million in 2018-19. Medicines were sent to more than 200 nations—from the highly regulated North American and European markets to countries with limited drug manufacturing capacity, including most of sub-Saharan Africa, wrote researchers at the University of Oxford in *F1000 Research*, an open access publishing platform, in April this year. Indian manufacturers represent 67 per cent of the 563 WHO pre-qualified pharmaceutical products for HIV/AIDS, diarrhoea, hepatitis, malaria, influenza, reproductive health, tuberculosis and neglected tropical diseases. Unfortunately, production of 130 of these drugs is dependent on APIs sourced from China. Of the total import of APIs in

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India, 67.56 per cent is from China.

On March 13, when the BJP and Congress leaders Prabhakar Kore and Selja Kumari questioned in the Rajya Sabha about drug security, chemicals and fertilisers minister D V Sadananda Gowda said that according to the Central Drugs Standard Control Organisation, the present stock-in-hand of APIs would be sufficient only for two to three months to produce formulations. The government's ban on export of APIs and formulations was a result of this fear.

A DEPENDENT WORLD COUNTRIES PUT ALL THEIR EGGS IN ONE BASKET

Chinese dominance in the pharmaceutical sector has been questioned across the world. In an April-6 note, the US Congressional Research Service observed that COVID-19 "is drawing attention to the ways in which the US economy depends on manufacturing and supply chains based in China". White House trade adviser Peter Navarro is working towards relocation of medical supply chains to the US. Japan

and Australia have similar plans.

In September 2019, the European Fine Chemical Group, a non-profit association of European fine chemical manufacturers, published a briefing paper asking countries to reduce their dependence on China and India.

Maggie Saykali, director of Specialty Chemicals, a grouping of over 50 sectors of Europe's fine and consumer chemicals industry, says that massive offshoring of API production and Registered Starting Materials leaves the EU dependent on China and India for close to 80 per cent of its medicinal products. COVID-19 has underlined these dark spots of global supply chain, says Saykali.

Only 28 per cent of the manufacturing facilities making APIs for the US markets were based in that country. This was told to a US House of Representative subcommittee by Janet Woodcock, director, Center for Evaluation and Research, US FDA.

In her testimony, Woodcock quoted two papers to highlight why China and India are in advantageous position when it comes to producing APIs. Referring to a

2009 paper by the World Bank—“*Exploratory Study on Active Pharmaceutical Ingredient Manufacturing for Essential Medicines*”—she said if a typical Western API company has an average wage index of 100, the index is as low as 8 for a Chinese company and 10 for an Indian company. Referring to a 2011 FDA report—“*Pathway to Global Product Safety and Quality*”—Woodcock said China and India enjoy advantage of low labour costs which reduces the API manufacturing costs.

API manufacturing in India can reduce costs for US and European companies by 30 to 40 per cent. Manufacturing in China gets benefit of lower electricity, coal and water costs. Chinese firms are also embedded in a network of raw materials and intermediary suppliers and, therefore, have lower shipping and transaction costs. They face fewer environmental regulations regarding buying, handling and disposing toxic chemicals, leading to lower direct costs for these firms, Woodcock said.

TOWARDS SELF-SUFFICIENCY

INDIA UNDERSTANDS DEPENDENCE ON CHINA IS A NATIONAL THREAT

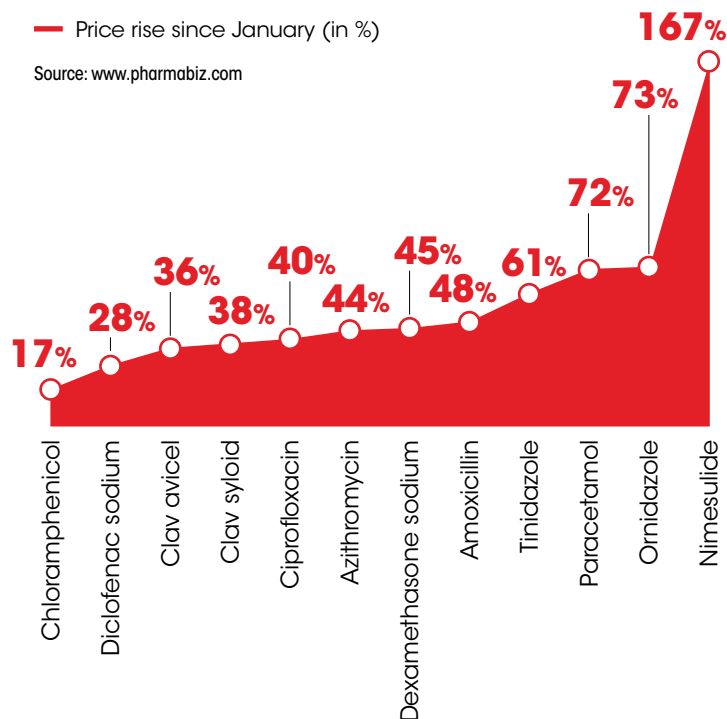
India, too, has been worried about its increasing dependence on China. In 2014, Rajya Sabha member Motilal Vora raised the issue of inappropriateness of importing API from a single country in the House. The same year, National Security Advisor Ajit Doval called the rising dependence on Chinese drug makers a “national threat”. In 2013, a high-level committee on promoting domestic manufacture of APIs had already been set up under V M Katoch, the then director general of Indian Council of Medical Research (ICMR) and secretary of the department of health research under the Union Ministry of Health and Family Welfare. In July 2018, a parliamentary standing committee report presented to the Rajya Sabha pointed out there was an urgent need to revive the country’s capability to produce APIs. The committee

On a high

Prices of active pharmaceutical ingredients, used in making drugs, have risen steeply since the spread of COVID-19

— Price rise since January (in %)

Source: www.pharmabiz.com



noted that China had increased the prices 1,200 per cent in the last two years. This slashed the profit margin for India’s industry.

To increase self-sufficiency, the Katoch committee’s report, submitted to the Ministry of Chemicals and Fertilizers in February 2015, recommended the creation of three to six mega parks. These parks should provide free or shared water, electricity, effluent treatment plants and testing facilities to the pharmaceutical industry. The government would have to invest ₹750-1,000 crore for each of these. The committee recommended that the private manufacturers should be provided benefits like 15-year tax-free status, access to loans and foreign investment. It also pushed for reviving the public sector Indian Drugs and Pharmaceuticals



Limited with an infusion of ₹500 crore.

While this committee's report was awaiting implementation, the government formed another task force in 2018, chaired by Mansukh Mandaviya, the Union Minister of State for Chemicals and Fertilisers. This, too, reiterated the recommendations of Katoch committee. India has already started work to revive the industry. Department of pharmaceuticals has approved development of mega parks in Andhra Pradesh, Telangana and Himachal Pradesh and is providing assistance up to ₹100 crore for creation of Common Facility Centre (CFC) in these under the scheme Assistance to Bulk Drug Industry for CFC. India's record in creating such parks has, however, not been good (see 'India has poor track record').

AFFORDABILITY IS THE KEY GOVERNMENT MUST STEP IN TO REDUCE PRICES OF CRITICAL DRUGS

Manufacturers say it is not easy to cut the umbilical cord with China for supply of basic drugs. The government needs to regulate drug prices to ensure that people have access to cheaper medicines. This, in turn, makes the pharmaceutical sector look for ways to cut prices, thus increasing their dependence on the low-cost Chinese model.

Beside availability, the affordability of medicines is a major challenge for India. Media reports already demonstrate that API prices in India have shot up after the pandemic (see 'On a high' on p36). China provides 75 per cent of APIs used in the formulations of drugs in the National List of Essential Medicines (NLEM) and there could be an increase in prices of medicines in the list. In a recent interview to the national daily *Financial Express*, Mandaviya said increased self-sufficiency in manufacturing of critical bulk drugs would ensure the availability of essential drugs listed under NLEM at affordable prices.

The government has to mandatorily ensure that prices are low as these drugs are part of the Essential Commodities Act,

1955, which regulates the prices of essential supplies like grains, foodstuffs and medicines. The list of drugs under price control has steadily expanded from 74 in 1995 to nearly 860 in 2019. According to brokerage firm Centrum Broking, going by the wholesale price index of 2019 and 2020, the increase in prices of drugs under NLEM would not be steep. However, prices of non-NLEM drugs would continue to increase at 10 per cent. "With China resuming supplies of raw materials, potential disruption in manufacturing is now no longer a concern. There has been inflation in select raw material supplies but the

MEGA PHARMA PARKS

India has poor track record

India's experience with dedicated vaccine "parks" has been disheartening. In 2008, the Union government decided that an Integrated Vaccine Complex would be set up at Chengalpattu near Chennai by HLL Biotech Limited (HBL), a subsidiary of HLL Lifecare Limited, which is a government of India corporation. Production was to start in 2012 with an estimated cost of ₹594 crore. But in 2018-2019, additional funds of around ₹300 crore were asked for. This demand was rejected. Though the infrastructural facilities have been set up in the park, production has not yet started. Recruitments began in HBL in 2013, but the employees who were supposed to set the research and production facilities at the park, have not been paid since July 2019. In June 2019, the workers were given the option to go on unpaid leave for up to five years and pursue other career options.

In November 2017, the Ministry of Health and Family Welfare announced the intention to sell 100 per cent government equity in HBL. The workers claim the decision was taken on the recommendations of the NITI Aayog to dismantle public sector organisations and promote private players which were already supplying vaccines at high costs.

In January, Bharat Biotech International, a private vaccine manufacturer based in Hyderabad, wrote to health minister Harsh Vardhan and showed interest in partnering with the government to revive the unit and invest in it. Bharat Biotech was willing to work with HLL Lifecare Ltd to manufacture and market several of their vaccines. But nothing has happened since then.



same should only have a minor impact on gross margins during the quarter,” brokerage firm Nirmal Bang says.

Private manufacturers have not been keen to provide medicines that are under price cap. They say it does not help as the poor are still not able to afford them. “The problem is that India spends too little on healthcare,” writes Amir Ullah Khan, professor of economic policy at the Indian School of Business and the Nalsar University of Law, in the national daily *Mint*. Instead of price control, he suggests that options like trade margin rationalisation, centralised procurement, social health insurance schemes, cross subsidisation and state financing of essential drugs should be used.

India has to keep the drug costs low. Its public spending on health is very low. It is unlikely that the country would be able to procure much if it buys at the private sector prices. Public sector pharmaceutical companies, therefore, become relevant as they can provide drugs at the cost price even after including the cost of pollution control.

PHARMA POLLUTION NO TIME FOR QUICK-FIX MEASURES. INDIA NEEDS STRICTER LAWS

Environmental pollution is, obviously, the most devastating byproduct of the drug-making race, but global efforts to reduce it have been tardy. In 2014, the EU issued a draft strategy to ensure that companies which supplied antibiotics to them were responsible and non-polluting. Under this, the EU members could have environmental clauses in international agreements. This would have allowed EU inspectors to visit factories in Asia or Africa to ensure that they were not polluting. But the draft was diluted. The replacement passage in the new 2018 draft merely gave the countries an option for “the possibility of using procurement policy to encourage greener pharmaceutical design”.

The dilution was linked to lobbying by drug companies. Voluntary declarations

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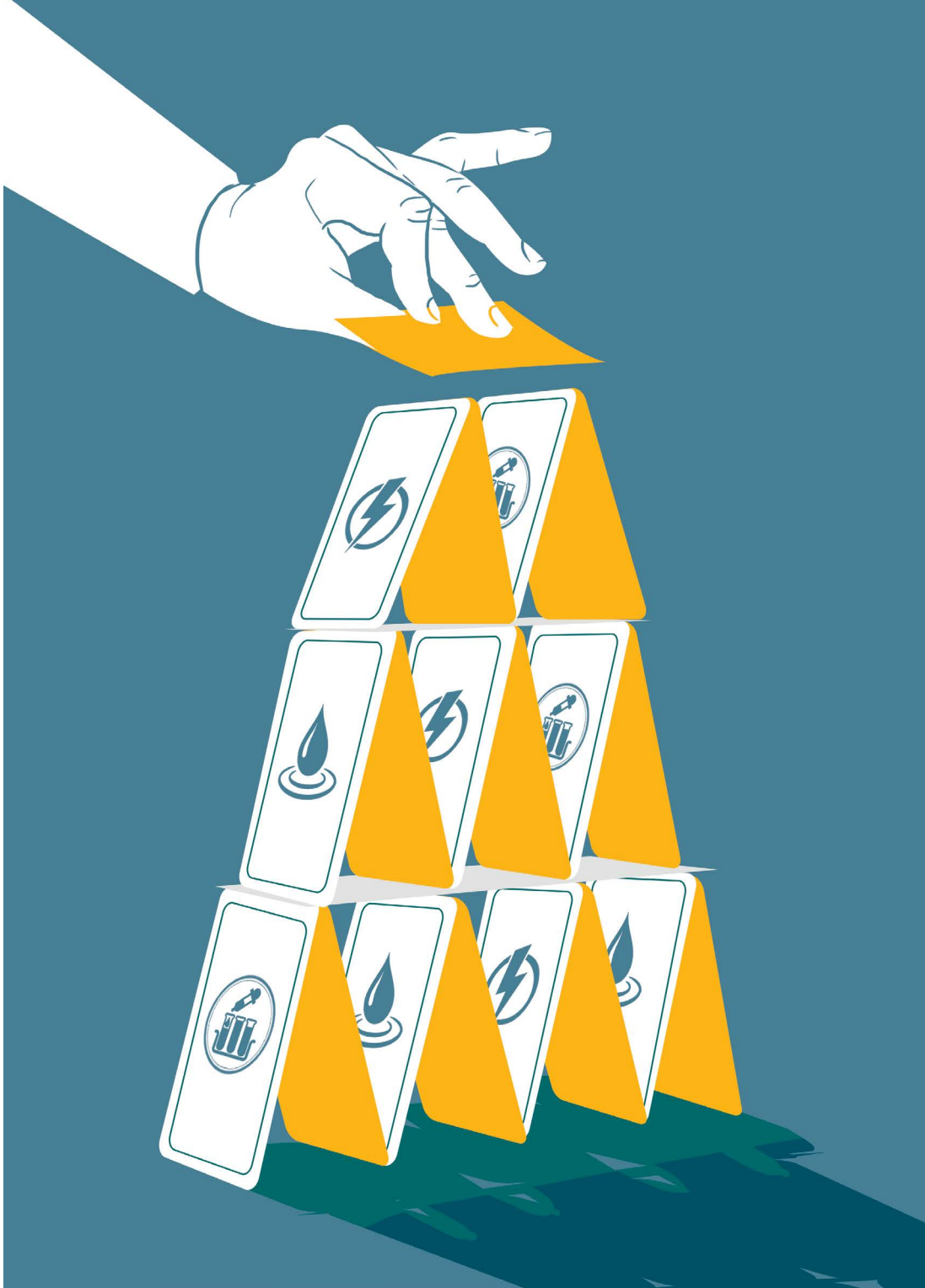
show that the pharmaceutical industry spent nearly €40 million (about \$37 million) on lobbying EU institutions in 2015. Public records show the European Federation of Pharmaceutical Industries and Associations had over 50 meetings with the Juncker commission in its first four-and-a-half months of office.

Fortunately, the European Parliament is demanding stricter measures again. Its environment committee has unanimously backed a call to go tough on pharmaceutical pollution, including reductions in drug use, greener manufacturing and better waste management.

Developing countries, too, are formulating policies to control pharmaceutical pollution. On January 23, India released a draft Environmental Standards for Bulk Drug and Formulation (Pharmaceutical) Industry to limit the concentration of toxins in effluents released by bulk drug manufacturers. It specifies maximum residues for 121 antibiotics that can be present in the treated effluent of bulk drug and formulation industry and in the outlet of the common effluent treatment plants. The draft notification also prescribes maximum concentration for various other parameters, including heavy metals and hexavalent chromium.

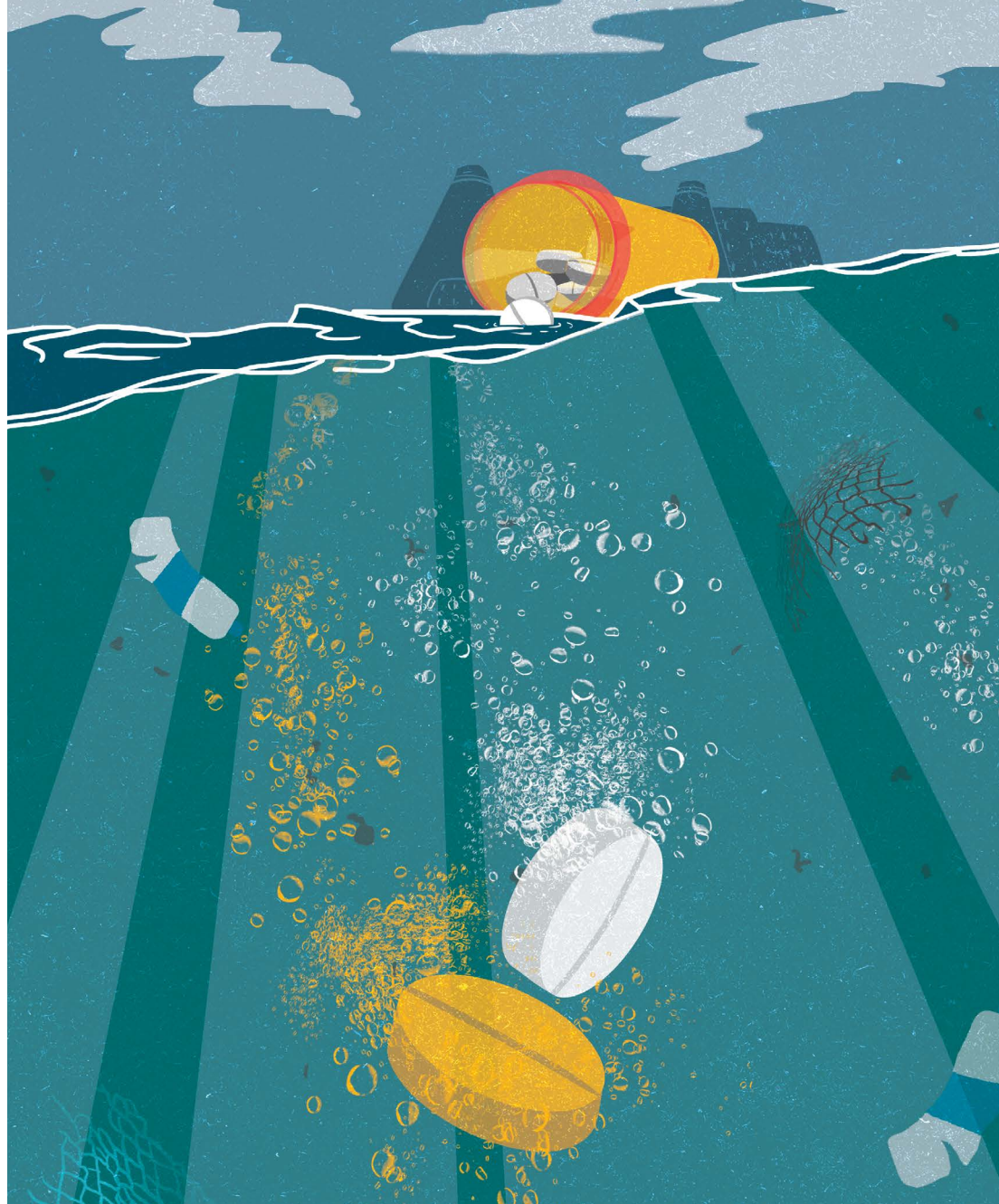
China, too, is trying to reduce environmental pollution. In 2002, it formulated the China Safety Production Law which controls all industries, including chemical and pharmaceutical. But the industry continued to pollute. With President Xi Jinping at the helm, it is taking action to ensure that the Chinese industry is in line with global environmental standards. Between 2016 and 2018, inspections led to the closure of 150 factories producing APIs, according to a white paper published by consultancy firm Beroe in July 2019.

In case of antibiotics, China issued strict guidelines in its National Action Plan 2016. It promotes green manufacturing of antibiotics and monitoring of effluents. In January 2018, China came out with an “environmental tax declara-



tion” under which less polluting industries are eligible for tax reductions. A 25-per cent tax relief is allowed if the discharge, mainly wastewater and air pollution, is 30 per cent lower than the national or provincial standards. If a company is able to maintain its pollution level at 50 per cent lower than the standard concentration, they can apply for a 50 per cent

tax reduction. According to the Beroe white paper, China also plans to put in measures so that polluters would face a levy of between 1.2 yuan (\$0.18) and 12 yuan (\$1.8) for every 0.95 kg of nitrogen oxide or sulphur dioxide they release. According to estimates, taxes up to 50 billion yuan (about \$7.68 billion) will be collected annually from manufacturers.



Such stringent pollution norms would increase manufacturing costs and take away China's competitive edge. Earlier too, diligently operating European firms went out of business because they could not compete with a non-compliant China, according to an article published in *Chemical & Engineering News* in 2018. It says a strict inspection regimen could trigger a migration of business back to the West as environmental compliance would increase the cost of operating in China.

India, however, has been unable to control pollution in its pharmaceutical

hubs like Patancheru-Bollaram Industrial Estate in Telangana, Baddi Industrial Area in Himachal Pradesh, and SIPCOT Industrial Estate in Cuddalore, Tamil Nadu. This despite the Environment (Protection) Rules, 1986, in force. India's new pharmaceutical parks are planned in these very places.

At a recent meeting with NITI Aayog, the Department of Pharmaceuticals promised fast environmental clearances to the industry. Such quick-fix measures would be detrimental in the long run unless strict regulations are put in place. India has to be more cautious now.



TIME TO RETHINK COUNTRIES HAVE TO MANAGE COSTS AND COMPETITIVE MARKET FORCES

China claims it has resumed production of APIs and says it is unlikely that there would be any shortage in India or globally. The pandemic, however, has given the world a chance to do a rethink on the pharmaceutical industry. Countries have realised that their over-dependence on one can cause big trouble. They are now trying to become self-sufficient (see 'Big opportunity for India' on p42). India is developing legislations and employing public spending to bring API development back. The US and EU are also contemplating legislation to bring both APIs and Finished Dosages (FDs) back home.

But industry experts say this is not the way to go. "This would be a knee-jerk reaction," says Kiran Mazumdar-Shaw, chairperson and managing director of Biocon Limited, a biotechnology company based in Bengaluru. "The surge in demand has caused an acute shortage of medical supplies, diagnostics and medicines which ought to point fingers to the failure of global healthcare systems to stockpile inventory as a preparedness response to any public health crisis. Once the surge in demand recedes, countries would need to manage costs and competitive market forces will favour economies of scale," she says.

Others concur. "We believe that production of both APIs and FDs must be global, with trusted trade partners, to ensure that any type of national or international disaster does not cause a collapse of the manufacturing and supply of pharmaceuticals," says David Gaugh, senior vice-president, Association for Accessible Medicine, a trade association representing the manufacturers and distributors of generic prescription drugs.

Industry favours pharmaceutical parks as these would be SEZ-like structures with fiscal incentives, common utilities and common effluent treatment plants that can create economies of scale and lower operational costs. But some fear this

**INDUSTRY
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would help only the private industry. Y Madhavi, scientist at the National Institute of Science, Technology and Development Studies, New Delhi, says public sector is crucial in the regulation of the sector. Citing an example from 2008, she says public sector vaccine manufacturers were closed down with the assurance from private manufacturers that they would give affordable vaccines for the universal immunisation programme. This never happened. The industry makes huge profits with trade margins that can sometimes be 4,000 per cent of the cost price. In October 2019, the Department of Pharmaceuticals proposed a maximum trade margin of 43 per cent over cost price for 10,600 non-scheduled drugs.

Gopakumar says the solution lies in increasing the capacity, both in public and private sectors. "You need to have a new kind of public sector, maintain the assets that the private players can operate. The government has to spend the money. The private sector will make the money and pay the government back," he says.

Whatever mix be the strategy—private versus public sector or domestic production versus import—the industry cannot be permitted to pollute. This would result in a price hike. S Srinivasan, who runs a generic drug company LOCOST, says the price would not increase beyond 5 per cent if the chemicals are made in large quantities. "Much of it will be capital costs which need to be apportioned over time," he says.

This gives hope. "No doubt API production is highly polluting, but new technology must be brought and upgraded constantly to minimise the impact of pollution," says Sakthivel Selvaraj, director of health economics, financing and policy at Public Health Foundation of India, New Delhi, adding that the additional cost due to pollution control measures would be negligible. Even if these costs are factored in, India would still have an edge both in API and formulation business. **DTE**

(With inputs from Banjot Kaur)

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BIG OPPORTUNITY FOR INDIA

India can replace China as the world's preferred source of pharmaceutical ingredients

BY REJI K JOSEPH

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BULK OF the active pharmaceutical ingredients (APIs) required by the pharma industry across the world is produced in China and India. The COVID-19 pandemic has exposed the risks of global supply chains being focused on a single country, which currently is China. COVID-19 has sent alarm bells to national security establishments in many countries, including India, on the risks of relying on a single country for the supplies. So far, the economic efficiency argument prevailed, but now the security dimension is on the forefront, which would result in many countries adopting measures to reduce reliance on China. In such a scenario, India is likely to become the preferred country for sourcing APIs.

Many countries have declared intention to resort to Compulsory Licenses (CL), if required, for ensuring the adequate supply of drugs for treating COVID-19. (Compulsory licensing is when a government allows someone else to produce a patented product or process without the consent of the patent owner or plans to use the patent-protected invention itself, according to the World Trade Organization.) Israel issued a CL in March to import generic versions of Kaletra of AbbVie, which is used for treating HIV/AIDS and has been found to be useful in COVID-19 cases. The Indian Patent Act, 1970, has a provision that enables export under CL. Exports under CL, if countries resort to it, would be an immediate opportunity for Indian pharmaceutical industry. But India's gains from the opportunity in the API business would depend on how swiftly its policymakers respond to it.

While India is an exporter of certain APIs, it is quite dependent on China for many others, especially those produced through fermentation, and intermediates (chemical compound which is in the process of becoming an API from a raw material is called an intermediate). When supplies from Wuhan were affected, the price

of paracetamol went up 40 per cent in India. In order to eliminate the dependence on China for APIs and intermediates and to promote their domestic production, the Union Cabinet, on March 21, decided to launch a scheme at a cost of ₹10,000 crore. Under the initiative, ₹3,000 crore will be used to create common facilities in three API Parks, which are expected to be established by the private sector, while ₹6,940 crore will be used for the Production Linked Incentive (PLI) scheme over a period of eight years. Though this is a welcome initiative, it may not achieve the objective unless additional measures are incorporated to overcome the constraints India has compared to China.

It is expected that common utilities at API Parks and PLI are sufficient to offset the price disadvantage that Indian API manufacturers have as compared to their Chinese counterparts. But it might not turn out to be so. Price competence that Chinese firms have acquired has two key aspects—their larger scale of operations and superior technologies. The average size of SEZs in India is about 1 per cent of the average size of SEZs in China. They use technologies that rely on cheaper raw materials like cauliflower for fermentation whereas our firms use glucose and lactose which are much costlier. Moreover, it may take about eight years to set up API Parks and begin commercial production. By then, the Chinese are likely to have come up with even better technologies that further push the prices down. This possibility would amount to business insecurity for the potential Indian investors in the proposed API Parks.

As we have a structural disadvantage in terms of the size of SEZs, we need to focus on cost-effective and greener technologies. This technology component has been missing in India's recent initiatives to boost domestic production of APIs and intermediates. Development of appropriate technologies has to be done in a mission mode and the large network of Council of Scientific and Industrial Research laboratories and public sector universities can be used. The business insecurity will be overcome if API Parks with common utilities are established by the government and then enterprises are invited to establish their production units there. This will considerably reduce the cost for producers and partly offset the disadvantage India has in terms of size of operations as compared to China. **DTE**

(The author is an associate professor in Institute for Studies in Industrial Development, New Delhi)

INDIA'S GAINS FROM THE OPPORTUNITY IN THE API BUSINESS WOULD DEPEND ON HOW SWIFTLY ITS POLICYMAKERS RESPOND TO IT. WHILE INDIA IS AN EXPORTER OF CERTAIN APIS, IT IS QUITE DEPENDENT ON CHINA FOR MANY OTHERS

BETWEEN A CURE AND ACCESS

As researchers scramble to come up with therapies to treat COVID-19, patents could keep the drugs out of reach for many

LATHA JISHNU

RELATED STORY
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IT IS a feverish hunt for ways to treat one of the deadliest infections the world has known since the 1918 Spanish flu. As millions more are infected by COVID-19, researchers are scrambling to come up with a range of items to cope with the pandemic—from easy-to-use diagnostic kits and medicines to the holy grail of them all: a vaccine against the severe acute respiratory syndrome (SARS) coronavirus-2, which causes the COVID-19 disease.

Vaccines, however, are a long way off even though over a hundred pharma companies, research institutions and global collaborations have been set up to find the magic bullet (see ‘Hope or hype?’ on p46) to halt the pandemic. The vaccine hunters may be attracting big money and headlines, but as much of the research attention is focussed on existing therapies to help patients—especially those who become critically ill—to fight the virus. These endeavours are as fascinating as they are varied, drawing in systems biologists, Big Pharma, universities, start-ups and a host of others in an effort to stop SARS-CoV-2 from reaping a deadly harvest.

Since every virus is different, new drugs have to be developed to fight diseases. But this takes time—of several years—and requires humungous amounts of money. COVID-19 does not allow us that kind of luxury; it spreads extraordinarily fast and that is the danger that hangs over the world, although compared to other viruses such as Ebola and Zika it is not so deadly. So readily available drugs are under the scanner in laboratories across the world where researchers are narrowing their search to find medicines that work best against the virus. Repurposing is the new strategy.

It was the Chinese who showed the way. They used an experimental drug, remdesivir, developed by Gilead Sciences of the US to fight Ebola, in combination

with chloroquine, the tried and tested warhorse in the battle against malaria (see ‘The great coronavirus drug hunt’, *Down To Earth*, 1-15 March, 2020). Remdesivir did not work against Ebola, but is one of the drugs showing promise in tackling COVID-19. There is also favipiravir, which was developed in 2008 by Fujifilm Toyama Chemical Co of Japan to treat the West Nile virus, foot and mouth disease and yellow fever, and is reported to have shown “excellent results” in the treatment for COVID-19 in China in January and February this year. Several countries, notably Russia, are betting on favipiravir, marketed as Avigen, to fight the COVID-19 pandemic.

Elsewhere, too, innovative therapy involving a cocktail of drugs meant for different ailments has found to have been effective in treating patients. In Thailand, a combination of oseltamivir—used to treat influenza—and HIV drugs, lopinavir and ritonavir, have been used to cure a few patients with severe symptoms, according to press reports from Bangkok, but later reports from China said the tests had proved negative.

Is it now a simple matter of producing enough remdesivir, favipiravir and certain HIV drugs to come up with a cure? For one, there is the patent hurdle. For another, precious little research has gone into repurposing drugs in the country.

The biggest block, of course, is the patent protection on drugs that are making news. This means generic drug firms cannot make inexpensive generic versions of the medicines. In India, the main patent on favipiravir expired in August last year, but there is a catch: Fujifilm Toyama holds four other patents on the molecule, one of which lasts till 2028. In the case of remdesivir, the patent claim was filed in October 2015, which means it will stay in force till 2035. Curiously, India approved the patent claim only in February this year soon after reports emerged from China

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HOPE OR HYPE?

Numerous companies are in the fray to make a vaccine. But can they deliver?

IN EARLY April, TV channels in India went to town on a story that a Hyderabad-based drug company would soon be coming out with a vaccine against the severe acute respiratory syndrome (SARS) coronavirus-2 or SARS-COV-2. With panic spreading about the pandemic, the news quickly made headlines since Bharat Biotech's announcement put a desi company as a front-runner in the vaccine race.

For Bharat Biotech, it meant good publicity. The CorFlu vaccine, for which it will only start clinical trials in the fall of 2020, is being developed in the US by the University of Wisconsin in collaboration with vaccine company FluGen. This means the vaccine is at least 18 months away. At the last count, five other Indian companies, among these Zydus Cadilla and Mynvax, had also thrown their hats into the ring with one or more candidates.

The most interesting collaboration is between the Serum Institute of India, which produces the largest number of vaccine doses in the world and Germany's Max Planck Institute for Infection Biology. The project has a more modest aim: to provide an immunity boost until a vaccine specifically effective against COVID-19 is developed. Based on repurposing, the German institute is trying to find out if its vaccine candidate VPM1002, an improved version of the 100-year-old

BCG tuberculosis vaccine, can be effective. The large-scale study is to be carried out at several hospitals in Germany and will include two groups most at risk: older people and healthcare workers. The other partner is Vakzine Project Management (VPM), which is now majority owned by the Serum Institute, and has been granted the licence for the new TB vaccine.

On the global landscape, there are over 100 companies jostling for funding and limelight. Some companies have received generous funding from the Coalition for Epidemic Preparedness Innovations (CEPI), a global organisation based in Oslo. Backed by the Bill & Melinda Gates Foundation, CEPI is raising US \$2 billion to funnel more money into companies that have emerged as the frontrunners.

But let's assume that some vaccines are developed soon. Then who will benefit from the breakthrough? CEPI says that there are no rules in place for a fair allocation system, but is working on a plan to ensure this. A better solution would be for WHO to act on an ambitious proposal made by Costan Rican President Carlos Alvarado Quesada to pool rights to all technologies that are useful for the detection, prevention, control and treatment of the COVID-19 pandemic (see 'Patent pool to fight the pandemic', p48). The EU has backed the move.

about its success in treating COVID-19 in a combination therapy. A patient aid group has contested the patent, pointing out that remdesivir lacks novelty, creativity and an inventive step, which are perquisites for grant of patents.

There are, however, other drugs which could be repurposed if the Indian generics industry is willing to do some research. The Quantitative Biosciences Institute (QBI) at the University of California, San Francisco, is offering such drugs on a platter. It first mapped

how COVID-19 attacks human cells. It then worked round the clock, through a network of 22 labs, to identify existing drugs that can disrupt the pathways of the new virus. It has so far identified 27 FDA-approved drugs that could accelerate the development of a treatment and bring it to the market much faster than a new drug would take. Since many of the drugs are no longer patent generics, firms could use this research to select those drugs that are best suited to their expertise.



For the moment, it is the hype and desperation that are driving reports of successful treatments rather than the proven efficacy of the repurposed drugs. The problem is that no controlled, randomised tests have been conducted so far. For instance, Gilead rushed to publish a study “Compassionate use of remdesivir for patients with severe COVID-19” on April 10 in *The New England Journal of Medicine* which was assailed by pharma experts. Duncan Richards, clinical pharmacologist and professor of clinical therapeutics at the Oxford University who described “compassionate use” as unlicensed therapy, said: “Research based on this kind of use should be treated with extreme caution because there is no control group or randomisation, which are the hallmarks of good practice in clinical trials.”

For Gilead, that was a major setback, coming in the wake of a major disappointment after China cancelled two clinical trials on remdesivir. On April 15, the Chinese authorities notified the US multinational that it was unable to conduct the test on patients with severe symptoms because the epidemic had been controlled and no eligible patients could be enrolled. A similar trial on patients with mild or moderate forms of COVID-19 was halted earlier. Gilead is now pursuing bigger trials.

In India, no work appears to have started on therapies and there are indications that the health authorities are banking on remdesivir to see the country through. The chief of the Indian Council of Medical Research has said that it would be using the drug if local companies could make it.

Can they do so? Yes, if they secure a voluntary licence (VL) from Gilead. This appears to be a distinct possibility since some companies have announced plans to work on remdesivir in recent days. Besides, Gilead is known for using the VL route in India, which allows the company to dictate the terms of

manufacture, from price and quantity to marketing restrictions.

Compulsory licences (CLs) should be the preferred option since India’s patent law allows their use in the case of a public health crisis. However, the Narendra Modi government is unlikely to pump for CLs since it could mean a confrontation with drug multinationals and the Trump Administration. This has become clear since Modi first came to power. The latest instance of such pusillanimity was the alacrity with which Delhi revised its policy barring exports of hydroxychloroquine after Donald Trump warned of retaliation if India did not supply the drug.

This is in sharp contrast to what is happening elsewhere. A swathe of countries—from Germany to Chile and Israel—have recently passed laws to allow them to issue CLs and use other such measures to cope with the crises caused by the pandemic.

The possibility of India coming out with its own treatment seems extremely slim at the moment. Yusuf Khwaja Hamied, the iconic chairperson of leading drugmaker, Cipla, has spoken of repurposing its HIV drug Lopimune—which is a combination of lopinavir and ritonavir—for the treatment of coronavirus. He also said that work would commence on other promising anti-viral compounds—favipiravir, remdesivir and bolaxavir. But Hamied who gave hope to millions afflicted with HIV/AIDS may find himself hamstrung now.

His company, like others in the country, is facing an acute shortage of active pharmaceutical ingredients (APIs)—raw materials used to make drugs—which is supplied by China. Over the past decade, the Chinese had become the principle supplier of APIs to India by undercutting domestic firms. The recklessness of such a short-sighted policy that allowed local API manufacture to die out has come back to haunt the country. 

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THE COUNTRY
THROUGH**

Patent pool to fight the pandemic

IT WAS a short letter that Costa Rican President Carlos Alvarado Quesada wrote to the WHO director-general in March, but it contained an ambitious proposal. WHO, said Quesada, should create a pool of rights, on a voluntary basis, to all technologies that are useful in the detection, prevention, control and treatment of the COVID-19 pandemic.

Quesada's proposal was grand in its scope. The pool should include not just rights in existing and future patented inventions and designs, copyrights and blueprints for manufacturing diagnostic tests, devices, drugs, or vaccines but also access to regulatory test data, knowhow and cell lines. It should provide for free access or licensing on reasonable and affordable terms, in every member-country. He urged WHO develop an initial concise memorandum of understanding on the intent to share rights in technologies funded by the public sector and other relevant actors, and reach out to member-states, non-profit institutions, industry and others, to sign such an MoU. The specific details could be worked out later.

Tedros Adhanom Ghebreyesus welcomed the proposal immediately, saying that WHO is working closely with governments and agencies around the world to promote rapid R&D, an effort rooted in its "commitment to equitable access for all". While the WHO chief's anodyne response did not address the ticklish issues in Quesada's letter, beleaguered as he is by the withdrawal of financial support by US President Donald Trump, support for the proposal came quickly, and from an unexpected quarter—the European Union. The 27-nation bloc, some of whose members have suffered the worst of the pandemic so far, is all for promoting "equitable access".

It has proposed a draft resolution that will

urge the World Health Assembly (WHA), the decision-making body of WHO, to voluntarily pool intellectual property (IP) in order to ensure equitable access to vaccines, therapies and other medical products needed for combating the pandemic. WHA is scheduled to hold a virtual session in May.

The concept of a patent pool is not new. Ten years ago, the UN-backed Medicines Patent Pool (MPP) was set up to increase access to medicines to treat HIV, hepatitis C and TB for low- and middle-income countries. MPP partners with civil society, governments and the pharma industry to license these life-saving medicines to generic manufacturers who supply it at a much lower cost. So far, the

A global pool of rights to all technologies useful in fighting COVID-19 is vital to ensure equitable access

pool has secured the IP for 18 drugs, some of them new, from the top innovator companies, showing that crucial partnerships can sometimes be forged with Big Pharma in a good cause.

With the COVID-19 fatalities accelerating, MPP has decided to temporarily expand its mandate to include any health technology that could contribute to containing the pandemic. It has offered its IP and licensing expertise to WHO, thus adding to the momentum for a patents pool to fight COVID-19.

WHO needs all the support it can get since nations which are diehard supporters of patent rights, foremost among them the US, are certain to balk at the idea of IP sharing, specially of the sweeping nature that Costa Rica has proposed. That's why the EU proposal is significant. It means it has broken ranks with the US. May 2020 should tell us whether more nations are ready to do the right thing. **DTE**

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Palette



WHAT'S INSIDE

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Ageing dams, drying canals are blind spots in India's water, food crises management **P60**

RECOMMENDATIONS: PANDEMICS

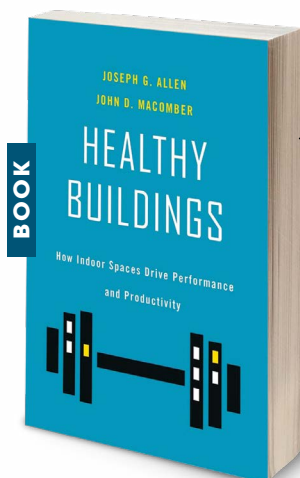
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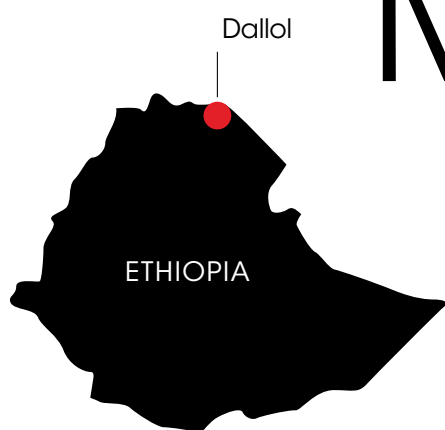
My Boyfriend Died of COVID-19 is a short animated documentary narrated by a girl about her fiancé's battle with the virus. As most patients in this pandemic, the man too faces enormous difficulties in accessing medical care. He ultimately dies alone in a hospital waiting room. The heart-wrenching animation is stunning not only because of its visual simplicity, but also because of the effortless ease in the way the story is told. In his last moments, the man leaves a letter addressed to the girl's future boyfriend.



Millions are infected. Death toll is mounting amid lockdowns and quarantines across the world. There's loss of livelihoods and shortage of medical equipment. Yet, no vaccine is in sight. Of all the viruses, why did COVID-19 create the kind of pandemic we have not seen in more than a century? How did this happen? What do we do now? How does a pandemic like this end? Netflix's documentary, *Coronavirus, Explained* attempts to answer these existential questions. It is to be released on April 26.



Even in pre-COVID-19 and non-lockdown times, we spend almost 90 per cent of our lives inside indoor spaces. Though there is a surfeit of studies about buildings from the environment point of view—how to save energy, water and waste—*Healthy Buildings* analyses these structures from the lens of health and productivity of people living in them. The authors present nine foundations that track the health indicators of people living in buildings and reveal how smart technology can enhance our well-being and boost performance and productivity. The book analyses how buildings can make us sick—indoor air pollution—and affect our creativity and problem-solving abilities.



MIMICKING MARS

A COMBINATION OF EXTREMITIES IN ETHIOPIA PRESENTS CONDITIONS MOST HOSTILE FOR LIFE THAN ANYWHERE ON EARTH. IT HAS TRIGGERED, YET AGAIN, A DEBATE OVER THE POSSIBILITY OF LIFE ON MARS

SHREESHAN V DALLOL

PHOTOGRAPHS: SHREESHAN V



(Extreme left) Hyper acidic and hyper saline pools fed by water that is heated and infused with gases from a shallow magma reservoir just below the surface at the Dallol volcanic dome; A resident of Afar region looks over the hostile landscape

flat plains leading up to the Dallol geothermal area testify to the submerged past of the region.

The Dallol hydrothermal field, spread over just 1 sq km around the Dallol volcanic crater, has brine-spewing vents and cones of mineral deposits. The Dallol crater has high concentrations of chlorine, sodium, iron, potassium, sulphur, magnesium and calcium. Their highly saturated combinations lend to the incredible colour palette and mushroom-like salt deposits.

While ambient temperatures here routinely cross 50°C in summers, the brine pools are so acidic they exhibit near-complete acidity with pH values close to 0! Acids with 0 pH values are around 1,000 times as acidic as lemon juice, which is 10,000 times more acidic than water. Needless to say the pools can cause serious damage upon contact with human skin.

This convergence of extremities offers conditions that might be most hostile to life anywhere on Earth. The hydrothermal system is regulated mainly by the iron content in the region without any microbial influence, states a 2018 report published in the journal *ACS Earth and Space Chemistry*.

The region has attracted the attention of miners since the early 1900s when Italian duo Adriano and Tullio Pastori and mining company Compagnia Mineraria Coloniale first mapped the potash reserves in the region. But the Danakil Depression first exploded in public imagination in 1974 when researchers discovered fossilised remains of *Australopithecus*

ENTERING ETHIOPIA'S Dallol geothermal area in the Danakil Depression, one of the lowest land areas in the world, one might as well have stepped onto an easel. Bright yellow mounds streaked and specked with hues of red and green create a dreamlike landscape. But numerous ponds stand unnaturally still here as they are fed by bubbling hot acid up to 108°C and brine that sputter out of the ground. A familiar stench of rotten eggs and rock salt overwhelms the olfactory nerves. The Danakil Depression, over the past year, has become a hotly contested stage in science's quest to

find the limits of life.

Situated in northern Ethiopia's Afar region, the Danakil Depression is placed at the triple-junction convergence of the Nubian, Somali and Arabian tectonic plates. The region is one of the few sites scientists can observe for the formation of a new ocean. It is replete with hydrothermal vents and volcanic craters of the Erta'Ale volcanic range. Increased volcanic activity some 30,000 years ago is believed to have created a ridge that cut off the depression from the Red Sea that previously occupied it. A coral graveyard and about a km-thick salt deposits that line the

Fumaroles, or openings that allow gases to emerge from the Earth's crust, and inactive geyser cones offer scientists a rare planetary analogue to study extraterrestrial surfaces; (Far right) the vast salt plains surrounding Dallol was Ethiopia's main source of salt for several centuries

afarensis, the extinct hominid that was named Lucy and lived 2.9 to 3.9 million years ago. The Afar region is also where remains of 4.4-million-year-old *Ardipithecus ramidus*, named Ardi, were found. The place, therefore, earned the title of being the birthplace of humans. After decades of inaccessibility due to socio-political unrest in Ethiopia and the remote hostility of the terrain, the region once again became accessible to scientists a few years ago when roads to the nearby hamlet Hama'dilla opened for public use.

SIGNS OF LIFE

Interest in the region spiked not because of anything on Earth, but the confirmation of evidence of water on the surface of Mars in September 2015. It was found that Dallol was a site where geochemical processes and seismicity could provide insights not only into Earth's own early evolution, but also showed incredible similarity with terrains observed in Mars and Titan. According to a March 2019 paper published in the journal *Astrobiology*, the physical and compositional features of the Dallol deposits, their mineralogies, sedimentary and alteration features, and their location in a

region of basaltic volcanism of planetary-scale importance, are testament to the novelty of this extreme environment and its ability to host life forms and to preserve biosignatures. It is, therefore, also a reliable analogue to ancient Martian environments and habitats. Deep investigation of the characteristics of this unique geological site will improve our understanding of the limits of life on Earth and inform the search for life on the Red Planet.

So in 2016, researchers headed to the hydrothermal geysers of Dallol to test the limits of organic

life and to find if life on Mars was a possibility. The Dallol region "has geomorphological signatures that resemble what can be identified in some Mars locations such as volcanic cones with phreatic associated characteristics. We chose samples from the region that accurately represented the Dallol systems and which would be interesting to use to describe life limits," explains Felipe Gomez, a senior scientist with the Centro de Astrobiologia, Instituto Nacional de Tecnica Aeroespacial in Madrid and one of the first researchers to reach Dallol in 2016.

After a series of papers teasing the possibility of life existing in the most hostile region on Earth's surface by members of Gomez's research team, the paper was finally published in May 2019, and almost instantly caused a stir. For



IT WAS FOUND THAT DALLOL WAS A SITE WHERE GEOCHEMICAL PROCESSES AND SEISMICITY COULD PROVIDE INSIGHTS NOT ONLY INTO EARTH'S OWN EARLY EVOLUTION BUT ALSO SHOWED INCREDIBLE SIMILARITY WITH TERRAINS IN MARS AND TITAN



the first time, the team documented evidence of ultra-microscopic life forms that had evolved in the poly-extreme environment of Dallol. Using samples from two geysers, researchers had detected traces of genetic material belonging to the super-diverse microorganism class *Nanohaloarchaea*.

“Through multi-pronged analyses of the samples we were able to demonstrate the existence of these extremophiles in the poly-extreme conditions of Dallol,” exclaims Gomez. What’s more, the study says that not only have they detected signs of active life in the region, but that microbial activity could be playing a role in mineral deposition that comprises the strange landscape of the region.

The excitement of finding traces of life on the most extreme environment generated a buzz

among biologists and enthusiasts of extraterrestrial life. It meant that organic life forms may have found a way to adapt even to the extreme inhospitability of environs of planets like Mars. “We have shown that life has wider limits than previously expected. I believe we will see more interesting results emerging from Dallol that will have strong implications on astrobiology,” says Gomez.

WATER IS LIFE. REALLY?

Locating the limits of life, however, is far from being a straightforward endeavour. Within half a year of publication of Gomez’s findings, Dallol was once again the stage for a major study. Controversy erupted in October last year when Purificación Garcia-Lopez, a research director at the French National Centre for Scientific Research in

Paris, and her team, published a paper detailing absolute lack of biological activity in the Dallol vents despite presence of water, making it the first such place known to humans and putting to test the edict that “water is life”.

Samples from Dallol, including from the brine lakes, taken over 2016, 2017 and 2018, were put through electron microscopy, ultra-filtration and DNA sequencing much like the earlier study, except that Garcia-Lopez’s team also conducted elemental analysis of the samples at the molecular level. While the team observed much of the same kinds of ultra-small biomorphs indicating the presence of life, the molecular analysis of the sample provided a starkly different conclusion. According to the paper published in November, sequences isolated from the Dallol ponds and

Towering salt and mineral deposits stand over inactive geyser holes



two of the highly saline, highly acidic lakes nearby were, in fact, contaminants brought by winds and the increasing number of tourists that visit the geological spectacle each year. The paper states that while it could not entirely rule out the possibility of active life in the samples, the results suggest absence of any life in the most extreme environments in Dallol.

According to the researchers, the Dallol hydrothermal field is the only site on the planet which has water but exhibits no trace of active life. The reason, they say, is two physico-chemical barriers to life. The first being high chaotropy in the Dallol ponds, which refers to the disruption in lipid arrangement and biomolecules caused by high concentration of certain dissolved salts, such as magnesium in the

case of Dallol. The second is posed by the hyperacid-hypersaline combination in the region. “Chaotropy combined with extremely high concentration of NaCl salts and the hyper-acidic conditions at and near the Dallol vents render it impossible for life to evolve and adapt to all the extremes simultaneously,” says Lopez-Garcia. She further says that her team was able to spot chemical biomorphs ranging from 200 to 400 nanometres in size that looked similar to microbes and can be easily confused for them. “These are not really microorganisms but rather silica formations that have also been observed in high concentrations alongside active microbial populations,” she explains.

But Gomez stands by the findings and inferences made by his team. “The controversy

regarding this is closed since we have used specific hybridization DNA probes that attach themselves only to specific ribosomal sequences that are expressed only if a microbe is active,” says Gomez. Lopez-Garcia, however, believes had the earlier research group employed stringent contamination controls, including the removal of background noise during the use of dyes to identify cell structures, the findings would have been similar to their own that shows the absence of any life form in the hyper acidic brine ponds of Dallol.

The story of life is far from over and future studies will likely throw some more light on the adaptability and limits of life, possibly paving the way for the exploration of any extraterrestrial life forms that may exist out there. For now though, one can only revel in the poetic quality of the coincidence that the place that birthed humans is once again the theatre for the exploration of life’s fundamentals and extremes. **DTE**

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IN OCTOBER LAST YEAR, A RESEARCH TEAM LED BY PURIFICACION GARCIA-LOPEZ PUBLISHED A PAPER DETAILING ABSOLUTE LACK OF BIOLOGICAL ACTIVITY IN THE DALLOL VENTS DESPITE PRESENCE OF WATER



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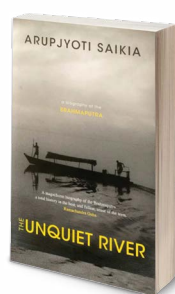
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EXCLUSIVE EXCERPTS

Turmoil in the floodplains

IN THIS EXCERPT FROM *THE UNQUIET RIVER*, ARUPJYOTI SAIKIA NARRATES THE TENSIONS THAT ERUPTED BETWEEN ASSAM'S PEASANTS AND MIGRANTS FROM EAST BENGAL IN THE BEGINNING OF THE CENTURY



**The Unquiet River:
A Biography of
the Brahmaputra**

By Arupjyoti Saikia

Publisher: Oxford
University Press

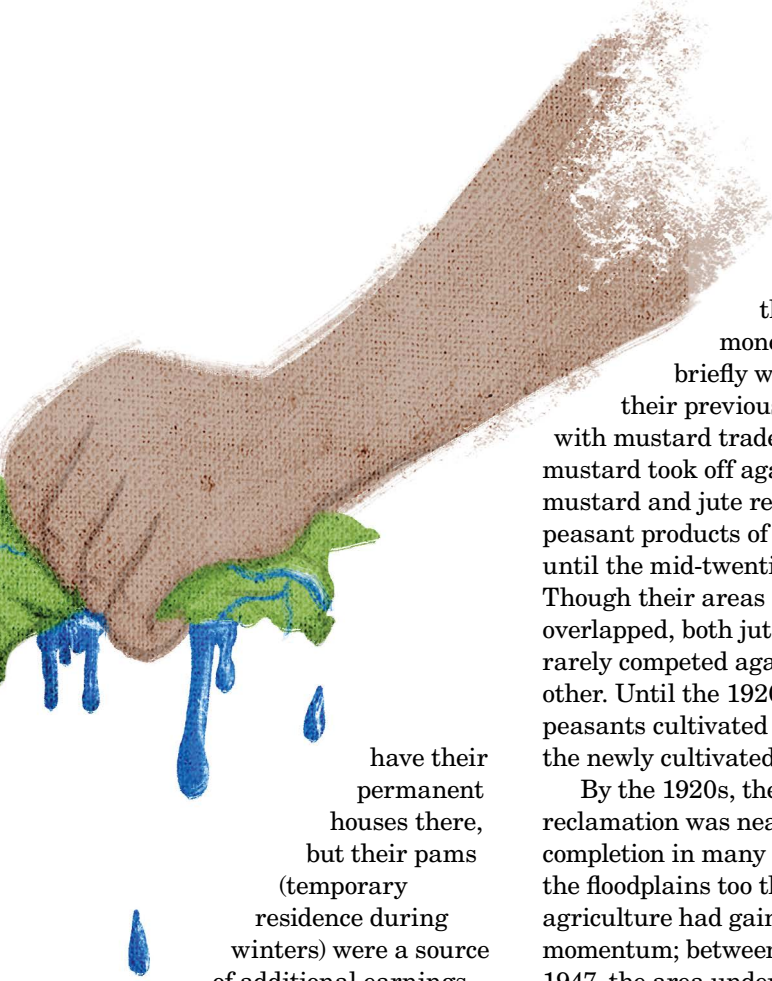
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ASSAM'S RATE of population growth was strikingly high compared to the all-India average between 1901 and 1931. The impact of the migration from East Bengal on the demographic composition of Assam was significant. Tensions erupted between the multi-ethnic Assamese peasant society and those who were now reclaiming the floodplains. Some Assamese intelligentsia such as Manik Chandra Baruah considered the new settlers as belonging to a 'notoriously turbulent class' while others welcomed them. This took the form of a relentless political crisis in the early decades of the twentieth century.

Jute production meant reclamation of lands near waterbodies, which were quintessentially not under the permanent plough. Migrant peasants retrieved large stretches of floodplains—from an estimated

38,000 acres [1 acre equals 0.4 hectare] in 1902 to 300,000 acres in 1932—along the Brahmaputra. The migrant settlers made the floodplains a lived space. In 1931, an official observed that in Kamrup 'the chars and riverain tracts have nearly been filled and all available waste lands are gradually being occupied'. Massive land reclamation temporarily resolved the British imperial concern of lands lying idle in Assam due to the Assamese peasants' supposed apathy and dislike of hard work. The migrant Bengali Muslim peasants were imagined as 'hard-working' compared to the 'simple and lazy' and 'non-productive' Hindu Assamese peasants.

The introduction of jute cultivation caused some drastic changes. The earliest casualty was the way in which the connection to the floodplains was forged. The Assamese peasants might not



have their permanent houses there, but their pams (temporary residence during winters) were a source of additional earnings, their hunting sites, their thoroughfare to the river gaits, fishing grounds, and so on. There was a life there beyond their villages. The new settlers came to these areas to live permanently.

However the introduction of jute had only moderately changed the existing crop pattern in the valley. In the first decade of the twentieth century acreage of both jute and rice increased but there was a fall in the acreage of mustard compared to the 1890s. Jute cultivation did not automatically replace mustard in those areas. It was the withdrawal of credit to the mustard producers that facilitated this decline. Earlier, both the Assamese and the Marwari merchants gave advance credit to the Assamese cultivators for mustard that was produced mostly in the central and eastern parts of the valley. This credit-trade equation played a key role in the sustenance of mustard production. Once the lucrative jute

trade firmly set in, the traders and moneylenders briefly withdrew from their previous engagement with mustard trade. However, mustard took off again. Both mustard and jute reminded key peasant products of the floodplains until the mid-twentieth century. Though their areas often overlapped, both jute and rice rarely competed against each other. Until the 1920s, most peasants cultivated jute only in the newly cultivated lowlands.

By the 1920s, the floodplain reclamation was nearing completion in many places. Beyond the floodplains too the march of agriculture had gained great momentum; between 1901 and 1947, the area under agriculture had almost doubled. New settlers now moved to newer places in search of land. They had two choices before them: to pay high prices to willing landowners or clear fuzzily demarcated government-owned forest lands or areas marked for graziers in the floodplains. Many Assamese landlords sold off their lands at speculative prices to the migrant settlers. But not everyone was willing to let the migrants go about their settlement process unchallenged. There were some localised skirmishes. Sometimes religious belief aggravated such conflicts. Competition over agriculture lands and the commons soon spilled over to the grazing reserves in the floodplains.

The apparent rapid prosperity of the migrant peasants angered the Assamese peasants. Soon this had sparked a major political debate. The migrant peasants' agricultural life, centered on the floodplains, appeared different

from that of the Assamese peasants. They seemed poised at a distance from each other. This separation was given a bureaucratic form in 1920 in the shape of what came to be known in official parlance as the 'Line System'. Its ideological origin could be traced to the imperial rulers' fiction on separate economic spaces for different religious and ethnic communities. The Assamese peasants and the Bengali migrant peasants were visualised as two distinct socio-economic communities. Aimed at regulating the settlement of the Bengali peasants, the Line System became a device to segregate new settlers from that of the Assamese peasants. The revenue officials drew lines on the cadastral maps leaving sufficient distance between the local people and the migrant settlers. Local people were forbidden to sublet their land to migrants; nor could the latter be employed with the local peasants' land. Each migrant family was provided with a maximum of 5.33 acres of land. The Line System, however, could not stop the peasantization of the floodplains and reclamation continued as usual.

The Line System became a bone of contention in Assam's politics. In the 1930s, groups representing Assam's Muslim electorate sought its abolition, while the Congress Party defended the system. Revenue officials also opined that rising migration had ended these restrictions ineffective. The migrant peasants, seen as crucial partners in the British jute industrial enterprise in Bengal, also resisted the Line System. As resistance grew, both political and physical, the government allowed the system to lapse by 1940.

“No single religious narrative has been able to assert claim over the Brahmaputra”

THE UNQUIET RIVER BY
ARUPJYOTI SAIKIA TRACES THE
TUMULTUOUS TRANSFORMATION
OF THE BRAHMAPUTRA OVER THE
CENTURIES. SAIKIA SPOKE TO
ISHAN KUKRETI



Your book is a crucial piece of environmental history that analyses people's relationship with the river. How important is environmental history as a form of history writing?

Understanding the changing relationship between the humans and nature is a major branch of historical studies in India today. In the last several decades, India has produced brilliant scholarships in this field. These scholarships have profoundly enhanced our understanding of the past and the present. Environmental history will gain more importance given India's poverty, population and uneven distribution of resources in the modern economy. Air pollution, spread of infectious diseases and poor civic amenities have become key points of public discourse. Insights drawn from environmental history can help us grapple with this crisis.

How has the perception of Brahmaputra—social, economic, cultural—changed in different epochs, so to speak, of the Assamese history, from the Ahoms to British to independent India?

This is true for most rivers of the world but we need to also bring in other factors. We may refrain from assigning agency only to the political forces. Changes brought in by economic or natural forces also need to be looked into, and the Brahmaputra can be an example to help us understand this. Perception about the Brahmaputra has changed over the long period but those changes cannot probably match by change of guard in the political regime. Even catastroph-

ic political events, like India's partition of 1947, changed the way we looked at the river. Again, the great earthquake of 1950 has brought changes in the river's flooding pattern. This also heralded Assam's outlook towards flood. Between 1943 and 1944, when India's east fast emerged as the front line of the World War 2, the river was one of the most talked about subject in the Allied military operations. Same was true in the 17th century. The Ahom-Mughal military hostilities were primarily regulated by the river. For the early British tea planters, the river was the only source of support.

"PERCEPTION ABOUT THE BRAHMAPUTRA HAS CHANGED OVER THE YEARS. POLITICAL EVENTS, LIKE INDIA'S PARTITION OF 1947, CHANGED THE WAY WE LOOKED AT THE RIVER. AGAIN, THE EARTHQUAKE OF 1950 BROUGHT CHANGES IN THE RIVER'S FLOODING PATTERN. THIS ALSO HERALDED ASSAM'S OUTLOOK TOWARDS FLOOD"

In many ways, the river is similar to the Ganga. But the religiosity that the Ganga is subjected to is more or less absent in the case of Brahmaputra. Why is it so?

I have not thought about it seriously. But the answer probably lies in the historical connections of the river with many ethnic communities of Assam. The river has evolved over the years to understand the rhythms of many languages—whether it is from Tibetan-Burman, or Aryan origins. No single religious narrative has been able to assert claim over the river. This does not mean the river does not command respect from com-

munities, whose beliefs and practices have remained less grammatical and more folkloric. Also, historically, these practices grew and survived without any major state-sponsorship, thus restricting the religiosity. But it has been people's river for long, and is deeply embedded in their world.

What were the main challenges you faced in writing the biography of the Brahmaputra?

A comparison with another river will be helpful. We can refer to the European history of industrialisation and the changing lives of peo-

ple in these charismatic European rivers. For instance, the Rhine underwent many layers of mechanical transformation to meet the demands of modern economic transformation of western Europe. This also resulted in intellectual investment in understanding the Rhine. One of the outcomes was the building of multifaceted archival repositories which embodied those epochal moments for the Rhine. Unfortunately, historians are not so fortunate to have archival experience for the Brahmaputra. This absence required venturing out into other domains, but still I was lucky enough to get the benefit from this exercise. [DTE](#) [@down2earthindia](#)



Damned by old age

Ageing dams and shrinking canal command area are the blind spots in the management of impending water and food crises

J HARSHA

THE PARADOX is perplexing. Bhagwant Singh is a farmer from Punjab, who owns a 2-hectare plot in the Bhakra Canal command area. Though his plot falls under the command area of one of the most iconic dams of Independent India, he depends on a tubewell for irrigation. Similarly, farmers in the Tungabhadra canal command in south India are unaware that the live storage of Tungabhadra dam has shrunk by over 20 per cent and concomitantly, the canal command area is shrinking. Whenever farmers see their field channels dry, they believe that it is due to drought! So it should not come as a surprise that millions of farmers across command areas of large and medium dams depend on

groundwater for irrigation. They neither are aware of the storage position in these dams nor the loss of live storage or sedimentation and age of the dams.

STATIC THINKING

India has 5,264 large dams, and hundreds and thousands of medium and minor dams—a majority of them provide water for irrigation through a maze of canal network. About 64 large dams are 120 years old, 300 large dams are between 70 and 120 years old, and cumulatively, about 600 large

dams are at least 55 years old. The scenario will become alarming in 2030, when about 2,000 large dams will be 50-120 years old, as the envisaged benefits from these dams will reduce substantially.

The reason is, as a dam ages, the live storage capacity designed for reservoirs will not remain static. It changes with time. The live storage of Krishnarajasagar dam built in 1931 cannot remain the same in 2020. This is because reservoirs get silted over time.

Moreover, dams are an assembly of different components

much like an automobile. There is spillway, the non-overflow section, stilling basin, piers, training wall (built to confine or guide the flow of water), gates and the core. These components were designed to withstand different loading combinations over time, and were built using different standards prevailing at the time.

According to Portland Cement Association (PCA), a US-based non-profit, moisture, acids, sulphates, chlorides and carbonates cause corrosion of reinforced steel that leads to the deterioration of the built concrete. Therefore, dams are subjected to differential settlement of foundations, erosion of rip-rap (protection of embankments), clogging of filters, reaction between water and concrete, and, this leads to the deterioration in the functional life and increases the leakage of water or seepage from the reservoir. Such data of leakage of water from reservoirs has either never been estimated in India, or even if measured, remains shrouded in mystery.

In fact, the science of sedimentation of India's reservoirs is grossly underestimated. In 1999, the National Commission of Integrated Water Resources Development assumed a figure of 65 km³ as loss of storage capacity by 2050, whereas the erstwhile Planning Commission used another figure of 53 km³ with no specific studies. The reality however is different.

For instance, the sedimentation rate of Bhakra dam is 139.86 per cent higher than originally assumed, according to a 2003 study "Supply side hydrology in India: The last gasp". At this rate, the service life of Bhakra dam will halve in 47 years. And for Hirakud

dam, the sedimentation rate is 141.67 per cent higher than what the government has assumed. Sriramsagar in Andhra Pradesh, built in 1970, had lost 50 per cent of its live storage in 1999, and the live storage of lower Bhawani in Tamil Nadu, built in 1953, had reduced by 28 per cent until 2005, beyond which data is unavailable.

The extent of sedimentation of India's 5,264 large dams has not been officially estimated. So, the total loss of live storage from all dams, in particular large dams, remains unknown outside the agencies maintaining the dams. For ingenious farmers or even for water experts in government, it is difficult to distinguish whether

INDIA HAS 5,264 LARGE DAMS AND THOUSANDS OF MEDIUM AND MINOR DAMS. OF THE LARGE DAMS, 64 ARE 120 YEARS OLD, 300 BETWEEN 70 AND 120 YEARS OLD, ABOUT 600 ARE AT LEAST 55 YEARS OLD

drier canals are due to droughts or due to the ageing of dams. As canal commands run dry, the defunct dams will not only aggravate the water crisis but will also impact food security.

India's gross irrigation potential has been assessed as 139.9 million ha (mha), of which the contribution of gross irrigation potential from major and medium irrigation projects is 58.47 mha. This potential has been considered as static by vested interests promoting dams. But even after nearly a century of dam building activity in India, it is unclear how dams facing substantial live storage loss, low withdrawal of water from rivers and lower yield of reservoirs can still be assumed to irrigate 58.47 mha forever!

So, what are the solutions to combat this crisis? First, the loss of live storage from every dam in the country has to be estimated and placed in the public domain. Alternative solutions such as creation of water harvesting structures, check dams and groundwater recharge structures have to be built within the command area, and outside, to compensate the loss of live storage from ageing dams.

Second, defunct dams should be dismantled and research activities should begin to restore the flow path of the river and streams. Just like an obsolete vehicle or an electronic device is replaced with a new one, research should facilitate building alternate dams across the same site or in the vicinity of the old dam site. This will enhance the utilisable surface water capacity as well as the ultimate storage capacity. These new dams can restore the lost irrigation potential to some extent. In the US, about 1,000 defunct dams

have been knocked down. However in India, it is a stigma to even think of removal of dams as the entrenched engineer-contractor-politician nexus continues to present the lopsided story of the outdated benefits of dams, thus misleading governments and stakeholders.

It is time governments and stakeholders overhauled water agencies and transform them into multi-disciplinary agencies to get the rational perspective of dams. Otherwise, vested interests will always say that every water crisis is due to drought, and not due to the ageing of dams. **DTI**

(The author is director, Central Water Commission. The views expressed here are personal)

 @down2earthindia

Pandemic and the panchayats

INDIA DIDN'T have much to celebrate during the 40-day lockdown as the number of new COVID-19 cases and casualties just continued to mount. But if anyone is looking for the silver lining, it's there in almost every village: the pandemic has brought the ubiquitous panchayat members into prominence. During this crisis of unprecedented spread and scale, almost everybody needs to speak to a panchayat member—whether it's regarding quarantining the migrants returning to villages or for identifying the hungry and providing them with emergency food relief. Even a chief minister needs assistance of these elected members of gram panchayats more than his elected members of legislative assembly in this fight against COVID-19.

This is the reason Kerala and Odisha, which are being celebrated for their seeming win over the crisis, have entirely depended on panchayats in implementing the pandemic strategy. Now more are taking note of them: at least 16 states have rolled out their COVID-19 emergency strategies with panchayats at the helm.

Because of local governments, an Indian has more elected members per capita than a hospital bed or a doctor or a welfare officer—with 3 million of them, panchayati raj is the largest experiment in direct democracy in the world. They are now at the forefront of the battle. Officials in Kerala and Odisha say during the initial days of the pandemic this army of elected representatives came handy in tracking people who had returned from other states or countries with COVID-19 cases and in further tracing their contacts. Now they are proactively readying the infrastructure to treat people, arranging food grains for community kitchens and ensuring the crucial hygiene and social distancing in villages.

On April 15, the Union government made an exemption and allowed panchayats to use funds

under the 14th Finance Commission, earmarked for sanitation works, on COVID-19 related activities. Subsequently, Odisha gave sarpanchs or panchayat heads the power of a district magistrate so that could impose quarantine at village level. On April 24, the National Panchayati Raj Day, Prime Minister Narendra Modi interacted with panchayat members and lauded their efforts in managing the national health emergency.

But why have panchayats, often referred to as the third level of India's federal democracy and dismissed as another corrupt department, become a much sought-after institution? In the last 28 years, since the Constitution made them an elected government with clear functions, just like the Union and state governments, the country has accumulated vast local experience

India's local governments take charge as the fight against COVID-19 enters critical phase

in managing the complex development challenges. While as a country we have abandoned the five-year plan, a

panchayat during its five-year tenure makes at least five such plans every year: for sanitation, water security, education, works under the Mahatma Gandhi National Rural Employment Guarantee Act and for the overall development of village. In fact, they implement close to 80 per cent of rural development schemes, making them a unique elected body that also functions as the executive. At their disposal is a dedicated fund under the Finance Commission, just like states, and close to ₹90,000 crore a year under rural development schemes. During elections, they get voted out the most compared to the Members of Parliament and legislative assemblies.

When the history of India's first pandemic in the 21st century will be written, this grassroots governance system will emerge the winner. It's time we gave them their constitutional rights. We have transferred them functions. It's time we fully transferred the right funds and functionaries to make them effective. It's time we made them governments. **DTE**  @richiemaha

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