

16-30 APRIL, 2021

Down To Earth

FORTNIGHTLY ON POLITICS OF DEVELOPMENT, ENVIRONMENT AND HEALTH

Subscriber copy, not for resale

₹60.00

AFRICA
Inequitable
global distribution
of vaccines will
only prolong the
pandemic for
every country

AT RISK

INDIA
The government
must revitalise
public sector
units to meet
COVID-19 vaccine
requirements





**JINDAL SCHOOL OF
ENVIRONMENT & SUSTAINABILITY**
India's First Interdisciplinary Environment & Sustainability School



DID YOU KNOW?

**OVER 1 MILLION SPECIES
HAVE GONE EXTINCT,
ON OUR PLANET, WITH THOUSANDS
MORE ON THE VERGE OF EXTINCTION.**

“

Join Jindal School of Environment and Sustainability to learn more about wildlife conservation, climate change, environmental policy and much more!

With various courses covering multiple facets of environment including governance, law, economics, ethics, sciences and sociology, B.A. (Hons.) in Environmental Studies at JSES offers a one stop shop for those wanting to pursue environment as a vocation.

”

Meet the Dean

Our Founding Dean **Armin Rosencranz** (A.B., Princeton University; J.D., M.A., PhD, Stanford University), is one of the leading global experts in environmental law, policy and climate change. Apart from being a Trustee member of Stanford, he has taught Environmental and Natural Resources Policy, Energy Policy and Climate Change at Stanford University and University of California at Berkley for close to three decades and has been teaching at Jindal Global Law School since 2014/15.



**O.P. JINDAL GLOBAL
UNIVERSITY**
Institution of Eminence Deemed to be
A Private University Promoting Public Service

O.P. Jindal Global University, Sonapat Narela Road, Sonapat-131001, (Delhi NCR), Haryana
JGU - An Initiative of Jindal Steel & Power Foundation

For admission, contact:

+91 893 011 0914
adhiman@jgu.edu.in

+91 958 912 1901
aktripathi@jgu.edu.in

**ADMISSIONS
OPEN 2021**

<https://jgu.edu.in/jses/>



Scan the QR code to visit admission page

Zero-zero, net zero

WE HAVE seen furious activity on climate change in the first weeks of April in Delhi. No, I am not talking about action to fight climate change. I am talking about words and more words—much has been written about the position that India must take or not take when it comes to declaring a net-zero goal. Much has been discussed in closed-door meetings on the same. John Kerry, the US climate envoy, was in town in the lead up to President Joe Biden's climate leaders summit on April 22-23. He wanted to cajole and push us to act—say something big when the leaders meet.

The good news is that climate change is back on the agenda. The bad news is that we are discussing the wrong things; we are in danger of once again losing the opportunity to drive home the need for ambition and equity in climate change action. Just consider the narrative in Delhi. It was not about the need to take stock of what has been done or not done to meet the Paris commitments—the voluntary targets countries have taken to reduce greenhouse gas emissions in this decade; it was not about how minuscule, completely off track and inequitable the Paris targets are. It was not about the emission pathways countries are choosing to make drastic reductions as needed to avoid the climate change catastrophe. It was not about anything that matters.

Instead, the entire discourse was distracted by the completely meaningless discussion on net-zero—it is widely accepted that Joe Biden will declare his country's net-zero target for 2050 at the summit. The question was if, should and could India follow its net-zero date?

Why do I say this is meaningless? Firstly, let's be clear that there is no substance in the net-zero target that countries have declared. It is but an aspirational idea—something that they will work towards. Practically all the countries that have made the grandstanding declaration have no plans on how they will get to net-zero by 2050, or in the case of China, by 2060. So, it means nothing. It's about the idea of getting there and the hope that some so-called disruptive technologies will get scaled up and be ready for delivery when the date comes.

Secondly, net-zero as an idea itself is flawed. It means that countries will emit more; but they will mop up these emissions to say "net-net". How will they soak up the emissions? Two methods: one, plant trees that will sequester carbon dioxide that we will continue to emit and two, take the carbon dioxide and pump it back into the ground—carbon capture and storage technologies. But there are still many unanswered questions about this approach; there are huge challenges in estimating the "tree-soak" and there are issues to sort with the set of technologies, fancifully called negative emission. So, it's a scam—at least today—to talk about these as the real options going forward. You can argue that these so-called disruptive technologies will come and so we should not be rejecting this idea today. I would say yes, but our dependence on these still experimental technologies to save us will distract attention from what can and must be done today. That needs to be our conversation. Not net-zero.

Thirdly, net-zero is intrinsically inequitable. It was the Intergovernmental Panel on Climate Change (IPCC) that had said global net human-caused emissions of carbon dioxide would need to fall by 45 per cent from the 2010 levels by 2030, reaching net-zero by 2050. Given the fact that there is a huge and completely disproportionate difference in the emissions of the old-developed world and now newly developed China and the rest of the world, it would be logical to say that if the world needs to be net-zero by 2050, then these countries needed to have already turned net-zero or do so by 2030. No later. Then it would provide space for countries like India—way below in the historical emissions and current emissions—to declare a net-zero goal by 2050. In today's scenario, what could or should India do? Declare a net-zero goal by 2070? Twenty years after the US and Europe; 10 years after China. What does it even mean?

As things stand today and when Joe Biden grandstands his country into the net-zero world of 2050—do not clap. Do not cheer. It is not enough. Not by a stretch. Only ask if his country will meet the Paris commitments—so ridiculously meagre—by 2025. The US has to be 26-28 per cent below its peak levels in 2005 by 2025. In fact, US greenhouse gas emissions in 2019 were higher than that at the end of 2016. We also need real ambition by 2030, not talk of 2050.

The fact that Joe Biden is not a climate denier is good news. But it's not enough. Let's not end up losing another decade squabbling over yet another chimera. Climate change is real. It is time we stood up to it. [DTE](https://www.downtoearth.org.in) [@sunitanar](https://twitter.com/sunitanar)

The fact that Joe Biden is not a climate denier is good news. But it is not enough

Down To Earth

Founded in 1992 to arm you with knowledge critical to shaping a better world

FOUNDER EDITOR Anil Agarwal

EDITOR Sunita Narain

MANAGING EDITOR

Richard Mahapatra

ASSOCIATE EDITORS Vibha Varshney,

S S Jeevan, Snigdha Das,

Arnab Pratim Dutta (Multimedia)

CREATIVE DIRECTOR Ajit Bajaj

SUPPLEMENT EDITOR Sorit Gupta

REPORTING TEAM Ishan Kukreti, Akshit Sangomla,

Banjoit Kaur, Shagun Kapil

ASSISTANT EDITORS Aditya Misra, Rajit Sengupta

SUB EDITOR Dakshiani Palicha

WEB EDITORS Joyjeef Das, Rajat Ghai, Anshika Ravi,

Preetha Banerjee

DESIGN TEAM Chaitanya Chandan, Sanjit Kumar,

Shri Krishan, Vijayendra Pratap Singh, Ritika Bohra

PHOTOGRAPHER Vikas Choudhary

PHOTO LIBRARY Anil Kumar

PRODUCTION Rakesh Shrivastava, Gundhar Das

TECH SUPPORT Rajendra Rawat, Jaidev Sharma

MULTIMEDIA Sunny Gautam, Adithyan P C

INFORMATION AND RESEARCH SUPPORT

Kiran Pandey, Susan Chacko, Madhumita Paul,

Sheeja Nair, Lalit Maurya, Dayanidhi Mishra

CONSULTING EDITOR Anumita Roychowdhury

Vol 29, No 23; Total No of Pages: 60

Editorial, subscriptions and advertisements:

Society for Environmental Communications,

41, Tughlakabad Institutional Area,

New Delhi 110062.

Phone: 91-11-40616000, 29955124,

29956110, 29956394, 29956399

Fax: 91-11-29955879.

Email: editor@downtoearth.org.in

© 2021 Society for Environmental Communications. All rights reserved throughout the world. Reproduction in any manner is prohibited. Printed and published by Richard Mahapatra on behalf of Society for Environmental Communications. Printed at International Print-o-Pac Limited, B-204, 205, Okhla Industrial Area, Phase I, New Delhi-110020, India, and published at 41, Tughlakabad Institutional Area, New Delhi 110062.

To subscribe, sms 'dte Subscribe' to 56070 or visit www.downtoearth.org.in/subscribe

FOR ADVERTISEMENTS Jyoti Ghosh

jghosh@cseindia.org

FOR SUBSCRIPTIONS

K C R Raja, raja@cseindia.org



◀ Cover design: Ajit Bajaj Cover photo: istock, Reuters

Contents



30

Africa is the other continent after Europe which is under a tight grip of the COVID-19's second wave. If the world remains uninvolved, it will only prolong the course of the pandemic for every country

20

India must utilise its idle public sector assets to overcome the COVID-19 vaccine supply crunch



COVER STORY

07 Digest

Uttarakhand village uses technology to revive a spring

12 Soil

The world's 175-year-long agricultural study has great insights about farming practices

18 Warm start

Despite prevalence of cold La Niña conditions, spring and summer arrive early this year

52 Patently absurd

Will rights waiver make COVID-19 vaccines cheaper to produce? Probably not

54 Book excerpt

Oonga explores the human impact of environmental conflict

56 Opinion

Water assets built under MGNREGA must suit the ground typologies

58 Civil Lines

Mass poverty has returned to India after 45 years



Engage



Viable model to save rainwater in India

This is with reference to the editorial “Water in age of climate change” (16-31 March, 2021). Roughly two decades ago, Himachal Pradesh took up an initiative to trap rainwater. A series of contour trenches were built across the region, from the hilltop to the valley, in a staggered manner. Earlier, the first few days of monsoon in the region ended in a deluge. But the trenches helped prevent this by soaking up a lot of rainwater. During the monsoon months, the 5,000 trenches remain nearly always full of water. Since a single trench (about 30 cm deep, 30 cm wide and 150 cm long) holds about 135 litres of water, the hills trap a good 675,000 litres of rainwater several times during the monsoon season, eventually adding moisture to the ground.

The mounds now yield bumper harvests of fodder and fuel crops—the two most sought-after items in the agricultural landscape of the mountainous region. And when shared equitably among the local people, the crops are automatically guarded throughout the growing season without any fencing. This is a low-cost model of trapping rainwater, checking soil erosion, improving soil moisture and thereby local people’s livelihood. If implemented on a large scale, it could act as an effective pushback against water depletion and climate change.

VINAY
VIA EMAIL

ILLUSTRATION: RITIKA BOHRA / CSE

Nuclear is the answer

This is in reference to the column “Why nuclear is still unclear” (16-31 March, 2021). The major obstacle faced by renewable energy is its low capacity factor (the ratio of actual electrical energy output of a system over a given period of time to the hypothetical maximum possible output). Since nuclear energy has the highest capacity factor of any other energy source, it clearly is the answer. The Fukushima and Chernobyl accidents were simply failed experiments.

PURNIX
VIA EMAIL

Difference in degrees

This refers to the article “Cold comfort: The sun is cooling; doesn’t mean there’ll be no global warming” published online on September 23, 2020. I agree with the article. I live in the desert region of Phoenix in Arizona, US. Annual monsoons cool the middle of the Arizona desert. Less evaporation from the oceans mean hotter temperatures. Last summer, we only saw one storm. It would have been good to include such examples in the article to help people understand that lower temperatures in one region can sometimes mean more heat elsewhere.

JOHN
VIA EMAIL

Farming solutions

The cover story “An agrarian biopsy” (16-28 February, 2021) portrays a multi-faceted analysis of farmers’ crises that show no signs of abatement. But figures and statistics alone cannot provide solutions. Firstly, all states cannot implement the same solution. Secondly,

Letters



to say that farmers are shunning agriculture because it is a loss-making enterprise, is not entirely true. Some are leaving this profession because the population growth has divided the already small landholdings into smaller pieces. Cropping patterns that have evolved due to the advent of chemical fertilisers are also to blame. Farmers grow only staple crops like wheat, paddy, sugarcane for high yields. If this pattern is reversed in favour of mixed cropping, involving pulses, oilseeds and spices, along with activities like beekeeping, pisciculture and sericulture, the profession can be turned profitable.

L R SHARMA
SUNDERNAGAR, HIMACHAL PRADESH

Errata

The article "Women take charge" in the cover story "The chase and the change" (16-31 March, 2021) erroneously states that at Birbandh village of Bankura district in West Bengal, harvesting structures trap water flowing from higher land after 30 m from where the runoff starts over a horizontal spread of 40 m. The correct measurements are 30 ft (9 m) and 40 ft (12 m).

The panel on p26 in the cover story "Charging" (1-15 April, 2021) incorrectly says that India produced 3,400 MT of iron in 2019. The figure should be 3,400 MMT (million metric tonnes).

Both the cover stories have been corrected in the online version. We regret the errors.

ILLUSTRATION: RITIKA BOHRA / CSE



River revival changes people's fortunes

The Odi rivulet in the drought-prone Bundelkhand region of Uttar Pradesh has water through



the year, courtesy MGNREGA. This has increased total arable land in eight villages and raised the incomes of local people.

FOR MORE VIDEOS, SCAN



NOTICE BOARD

A colorful poster for the Babul Eco Film Festival. It features the text "5th BEFF 3-6 June 2021", "Babul Eco Film Festival Hyderabad-India", "SHORTFILM CONTEST <5 Mins on TOPIC ENVIRONMENT & PANDEMIC win prizes ₹ 50,000", "ECO FILM SCREENING SUBMIT NOW www.babul.ngo #beff2021 9618082288". There are also QR codes and a film camera icon.

SHOLAI SCHOOL

Located in the campus of the **Centre for Learning, Organic Agriculture and Appropriate Technology**, in a beautiful sylvan valley of the Palani Hills, we are a non-conventional, 70 acre residential School registered with the University of Cambridge International Examinations (IN499). The students take IGCSE (Xth standard) and A level exams. Having a teacher : student ratio of 1:6 we are able to explore **learning** well beyond the confines of syllabi.

Comprehension of conditioning and its limiting effect on the mind and reflecting on responsibility and sensitivity in relationships are some of the themes explored between students and teachers. Send for brochure to: Sholai School, P.O.Box 57, Kodaikanal - 624 101. Telephone-04542-230393/297/487 Email: cloaat@yahoo.com Website: sholaicloaat.org

Digest

WHAT'S INSIDE

Women in rural Uttarakhand step up to end their water woes **P10**

Nepal shuts schools due to unhealthy air quality **P11**

More lightning strokes over the Arctic **P12**

1,000 WORDS VIKAS CHOUDHARY



Garbage dumps are changing food habits of animals such as this langur seen in Rishikesh, Uttarakhand, chewing on a wrapper. A 2019 study published in *Current Science* says some species are becoming increasingly dependent on anthropogenic food waste and can accidentally ingest plastic leading to several health problems such as stomach ulcers, reproductive disruptions and premature death.

FOR MORE PHOTOS, SCAN



Spring back to life

FOR DECADES, women in Uttarakhand's Dubroli village spent a large part of the day fetching water. They would make five to 10 trips on foot to the lone spring some 2 km from the village, carrying water in buckets for household chores.

Like other villages in Lamgara block of Almora district, Dubroli was perpetually water-scarce. The monsoon was scanty and government-installed pipes would run dry for months on end. But in 2019, Dubroli's women took matters into their own hands with some help from Central Himalayan Rural Action Group (CHIRAG), a Uttarakhand-based non-profit that works on changing people's lives in the state. Using GIS (geographic information system), CHIRAG's engineers mapped aquifers in the region through which groundwater moves or remains deposited. "In the conventional approach, watershed management activities are carried out over, say, 50 to 60 hectares (ha) around the aquifer. Using GIS mapping technology, this area of focus can be reduced to just 3 to 15 ha while guaranteeing water availability," says Badrish Singh Mehra, executive director of CHIRAG.

After the mapping, the village residents

A non-profit's technological approach for springshed rejuvenation helps Uttarakhand women end their water woes

ADITHYAN P C

decided to set up a water committee to draw a plan to end their water woes. "We identified a spring that runs right in the middle of the village and is on top of an aquifer which is close to the surface," says Neeta Saha, a resident and head of the water committee. Next, they made recharge pits at the source of the channels that feed the aquifer and the spring. "We also planted trees along the channels and made check dams to ensure all rainwater gets drained into the spring," she says. The spring today has water round the year and the women need to walk a mere 200-300 m to fetch water. It helped them immensely during the lockdown last year.

The committee looks after the maintenance of the structures and collects money from each household for the same. They have also requested the Uttarakhand government to connect their households with the spring through pipelines.

"The community engagement has facilitated ownership of the projects among the people," says Abhishek Likam, assistant team leader, spring water recharge, CHIRAG. The non-profit launched its water revival programme in 2008 and has since rejuvenated 211 springs across eight districts in Uttarakhand.

Water warriors of Dubroli village: Nata Devi (extreme left), Neeta Saha, Deepa Bisht and Meeta Devi



POLLUTION

Nepal chokes under forest fires

ON MARCH 30, Nepal was forced to shut down all its educational institutions for five days after air quality of the Himalayan country dipped to hazardous levels. The country, in its advisory, also asked the elderly to stay at home.

On March 27, Kathmandu's air quality index reached 421, making it the most polluted city in the world. Scientists say the reasons behind the pollution and haze, particularly over the Kathmandu valley, are quite a few, which ranges from vehicular emissions, smoke from coal-fired brick kilns and construction works to the burning of forested land to grow fodder. Westerly winds that brings dust from South and South-West India also adds to this pollution load. What appears to



have exacerbated the situation this time is an increase in forest fires in Nepal. The government has reported over 2,700 forest fires between November 2020 and March this year. This is 14 times higher than in the same period last year and could be the worst

in a decade. Forest fire season in Nepal starts in the winter month of November and lasts until the onset of monsoon in June. This winter was drier than usual—Nepal received 25 per cent of the normal rainfall—which could have increased the risk of fires.

ENERGY

Companies oppose deep sea mining of minerals

INDUSTRY GIANTS Google, BMW, Volvo and Samsung SDI have announced a moratorium on deep sea mining of critical battery minerals like cobalt, manganese, nickel and copper. The companies have committed neither to use such minerals in their respective technologies nor to fund this activity. Deep sea mining involves extraction of the battery minerals from nodules (rock concentrations) that pepper the sea floor—they are particularly abundant in the North Pacific Ocean. Activists say such extraction would disrupt marine ecosystems and want more research. The companies' announcement comes at a time when many countries are planning to ratify deep sea mining to meet their mineral requirements. Norway may grant licences by 2023. India is awaiting approval from the International Seabed Authority, an intergovernmental body that regulates mineral-related activities on international waters, for its own programme.

ENVIRONMENT

Solar geoengineering test axed amid concerns

SCIENTISTS FROM the US and Europe called off a test flight under the Stratospheric Controlled Perturbation Experiment (SCOPEX) programme in Sweden on April 1 amid environmental concerns. SCOPEX is a Harvard University project that aims to use solar geoengineering techniques to inject sunlight-reflecting aerosols such as sulphur dioxide into the upper reaches of the Earth's atmosphere to minimise the Sun's impact on the planet's surface. Experts say it could adversely effect the Earth's climate and give a free pass to polluting industries to continue harmful practices. However, its proponents argue it should be considered as a viable option to combat climate change. On March 25, the US' National Academy of Sciences, Engineering and Medicine released a report recommending the country consider investing US \$100-200 million in a solar geoengineering programme to facilitate research and implementation.

QUERY

Lightning over Arctic

1 How has lightning activity over the Arctic changed?

Scientists with the University of Washington, US, have found that the lightning strokes above 65°N latitude (includes most of the Arctic countries) increased from 18,000 in 2010 to 150,000 in 2020. The share of Arctic lightning strokes in global activity rose from 0.2 per cent in 2010 to 0.6 per cent last year, with most activity concentrated over northern Siberia. The scientists have mapped the frequency of strokes during the summer months of June, July and August and attribute the rise in number to warming temperatures worldwide (see graph).

2 How do warm temperatures affect lightning frequency?

Lightning strokes occur when ice crystals inside convective clouds collide and produce an electric charge. Convective clouds are formed when warmer air rises through the cooler atmosphere. Hence, the increasingly warm temperatures over the Arctic region may be resulting in more convection and exacerbating the lightning activity.

3 What effect will the increase in strokes have on the Arctic?

In recent times, there has been an increase in shipping activity over the Arctic due to its melting ice cover. The increase in lightning strokes puts such ships in danger. The strokes can also cause wildfires on Arctic land.

BITS GLOBAL

WHO, EU and 25 other countries are pushing for a new global pandemic treaty to avoid the uncertainty and inequity seen during the COVID-19 spread. The treaty would aim to ensure that any information on outbreaks, virus pathogens, technology and vaccine development is shared with all nations. The proponents of the treaty hope to build a firm resolution in time for the World Health Assembly in May this year.



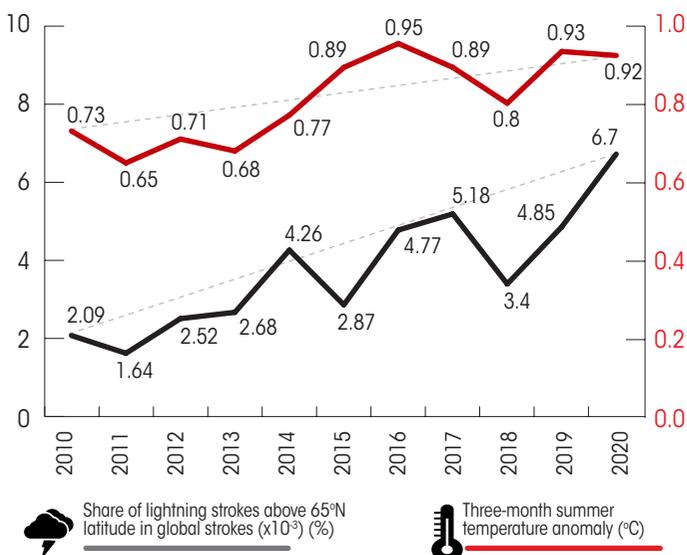
Brazil has become the 130th country to ratify the Nagoya Protocol that lays out specific rules for protecting a country's claims to its biodiversity. Under the protocol, nations agree to not remove biological material from other countries such as indigenous plants without the latter's permission and to share profits from products developed from that material.

Australia saw its quietest fire season in a decade, with good rainfall and cooler La Niña conditions offsetting the spread of bush fires. The state of New South Wales saw 31,000 hectares hit by fires during the bush fire danger period (October 1, 2020-March 31, 2021) as against 5.5 million hectares last year.

Sixty-four per cent of agricultural land across the world is at risk for pesticide pollution, says a new *Nature Geoscience* study. Scientists produced a map depicting pollution risk of 92 chemicals commonly used in pesticides across 168 countries. Land areas in Asia are at the highest risk—especially China, Japan, Malaysia and the Philippines.



UPWARD STREAK In the last decade, the global share of summer lightning strokes over the Arctic has tripled as a result of warming



Source: R H Holzworth, J B Brundell, M P McCarthy, A R Jacobson, C J Rodger, T S Anderson (2021), Lightning in the Arctic, *Geophysical Research Letters*, March 22, 2021

BITS INDIA

India deferred deadlines for coal-fired plants in less populated areas to adopt new emission norms by three years, as per a government notice. The Centre had earlier set 2017 as the deadline for thermal power plants to install flue gas desulphurisation units to cut sulphur dioxide emissions, which was later pushed to 2022. Now, plants in areas with a population less than one million have till 2025 for the same. Those that miss the target can continue operating after paying a penalty.

The Union environment ministry's expert appraisal committee (EAC) considered 837 infrastructure project proposals in 2020, the highest in three years, of which it cleared 439. Some EAC members said time given to scrutinise the proposals was insufficient. However, the ministry said all environmental appraisals and field assessments were done while considering the proposals.



India slipped 28 places to the position of 140 among 156 countries in the World Economic Forum's Global Gender Gap Report 2021, becoming the third worst performer in South Asia. The country closed 62.5 per cent of its gender gap to date, as per the report. Most of the decline occurred on the political empowerment subindex, where India slipped 13.5 percentage points due to a significant decline in the number of women ministers.

India's biggest floating solar power plant will start operations within the next month at Ramagundam thermal power plant reservoir in Peddapalli district, Telangana. Commissioned by the National Thermal Power Corporation (NTPC), the plant has an estimated capacity of 100 MW—in line with the country's mission to achieve 175 GW of renewable energy capacity by 2022.

FRAMEWORKS

- The coal minister introduced the **Mines and Minerals (Development and Regulation) Amendment Bill 2021** in the Lok Sabha. The Bill aims to remove the distinction between captive and merchant mines and empowers the Centre to issue directions regarding District Mineral Foundation funds.
- The Ministry of Road Transport & Highways notified the draft **Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021** that lay down the procedure for setting up, authorisation and operation of registered vehicle scrapping facilities.
- Bihar has become the first state to launch an **Ethanol Production Promotion Policy, 2021**, under the National Policy of Biofuels, 2018. The policy will allow the extraction of ethanol from maize and introduce investment incentives.

IN COURT

NATIONAL GREEN TRIBUNAL

■ In a case regarding the revision of the monitoring mechanism to oversee compliance of environmental norms, the National Green Tribunal (NGT) has told the Central Pollution Control Board, the Union environment ministry and state authorities that frequency norms for inspection must form part of clearance conditions.

■ In an issue regarding illegal coal mining by cement companies in East Jaintia Hills district, Meghalaya, NGT has directed a 12-member committee to look into the matter and take appropriate action.

■ NGT has directed the Uttar Pradesh Chief Secretary to look into allegations that waterbodies in Ghaziabad district were being diverted for industrial purposes, leading to increased encroachments and violating environmental laws.

SUPREME COURT

■ The apex court has sought the Union government's reply in a case alleging that the Centre cancelled around 30 million ration cards, including those of tribal and impoverished communities, because they could not be biometrically linked to Aadhar cards. The petitioner alleges such cancellations have led to several starvation deaths across the country. The Supreme Court (SC) has labelled these allegations as serious if true.

■ The apex court has constituted a seven-member committee to develop scientific and policy guidelines for governance matters related to felling of trees for developmental projects. The SC bench headed by Chief Justice SA Bobde has passed the order taking into account the value of trees in protecting the environment and combatting climate change.

So far...

Number of cases on environment and development tracked from January 1 to March 26, 2021

NATIONAL GREEN TRIBUNAL	SUPREME COURT	HIGH COURTS
134	36	45

Compiled by DTE-CSE Data Centre

FOR DETAILED VERDICTS, SCAN



Breaking new ground

The world's longest running agricultural study adds to the debate on organic-inorganic farming

SHAGUN KAPIL NEW DELHI

THE FARMLAND in the picture might look unremarkable to most. But for agricultural scientists, it is part the planet's most famous 4.5 hectares (ha). The field in Hertfordshire county of southern England has been under continuous scientific experiments for the past 178 years, making it the world's oldest and longest running study.

The research was started by agricultural scientist John Bennet Lawes and chemist Joseph Henry Gilbert under the Rothamsted Research institution in the autumn of 1843, when the first crop of wheat was sown on a

field named Broadbalk. Every year since then, researchers from the institute have sown winter wheat on all or some parts of the field to compare crop yields, when grown using inorganic fertilisers with those when grown using organic or farmyard manure (FYM). A patch that receives no fertiliser or manure inputs is also maintained for control treatment.

The aim of the Broadbalk experiment is to test the effects of different organic and inorganic fertilisers on soil fertility and study the optimum nutrition requirements to improve crop yield. The research took shape by growing the same crop each year

on the same land, a practice considered bad farming in the 19th century; Lawes and Gilbert had realised this was the best way to learn about the individual crop nutrient requirements.

AND STAGE WAS SET

Under Broadbalk experiment, the land was divided into 19 strips of wheat field, each 300 m long and 6 m wide. To test the benefits of different combinations, some strips received inorganic fertilisers, some organic and some others a combination of both. One strip was left received neither of these.

Modifications were made over the years. Wheat was grown con-



Scientists have been sowing wheat on this field, named Broadbalk, every year since 1843 to understand how to use fertilisers to improve crop yield



YIELDS GROWN AFTER A TWO-YEAR BREAK WERE MUCH HIGHER THAN YIELDS OF CONTINUOUSLY GROWN WHEAT. THIS WAS BECAUSE THE EFFECTS OF SOIL-BORNE PESTS AND DISEASES WERE MINIMISED

tinuously till 1968, when the strips were further divided into sections, with 10 of them growing the crop in rotation after a two-year break. On six sections, wheat was grown in two different three-course rotations with oats and beans. In 1978, one of the six sections reverted to continuous wheat; potatoes, oats, maize and beans were grown under a five-course rotation with wheat on the

remaining five sections.

These experiments were not envisioned to be long-term initially, but Lawes and Gilbert later thought more useful information could be gained by continuing them over many growing seasons. And they were not wrong.

After 175 years of study, the scientists have come up with some interesting observations. They have found that yields from the

section where wheat was grown with a two-year break, were higher (2 tonnes per ha) than from sections where wheat was grown continuously. The effects of soil-borne pests and diseases are minimised in case the field gets a two-year break, they say.

Another important finding is related to the use of soil nutrition. In the 1860s, the average yield of continuous wheat treated with organic manure was 2.35 tonnes per ha; yield from strips treated with inorganic fertilisers—phos-

“Incorporation of crop residues into soil has considerable benefits for soil health”

ANDY MACDONALD, manager, Rothamsted long-term experiments, Rothamsted Research, UK, speaks to *Down To Earth* on the key findings of the study

What does it take to sustain an experiment like this for almost two centuries?

Broadbalk is one of the several agricultural field experiments established by John Lawes and Henry Gilbert between 1843 and 1856. Lawes supported the experiments with funds from his fertiliser manufacturing business and eventually established the Lawes Agricultural Trust to ensure that the experiments continued after his death. The management of the experiments was subsequently taken over by the British government as part of their support for agricultural research and development. Some of the experiments continue today and are supported by the UK Biotechnology and Biological Sciences Research Council (part of UK Research and Innovation) and the Lawes Agricultural Trust, under its experimental facility, the National Capabilities, for use by scientists in the UK and abroad for new agro-ecological research.



What are the key takeaways in terms of soil health?

In addition to good management of organic manures, the management of crop residues is also important. In Broadbalk, there is an indication that inputs of mineral fertilisers, especially N and P, have resulted in slight increases in soil organic C and N contents, perhaps due to enhanced crop growth and increased returns of crop residues in roots and stubble. These increases were

associated with a decrease in the energy required to plough the soil (plough draft). Other long-term studies have shown that straw incorporation has also resulted in small increases in soil organic carbon and soil microbial biomass. There is evidence that these increases have beneficial effects on soil physical properties including aggregate stability, water infiltration and plough draft. Consequently, the incorporation of crop residues into the soil may well have considerable benefits for soil health.

How beneficial are long-term agriculture experiments for modern agriculture?

Long-term experiments provide a unique insight into the effects of changes in land use and management on agricultural systems, because these effects occur over extended periods of time and are characterised by considerable variability. It is only by collecting data over long periods of time that clear trends become apparent. Such data can be used to develop and test models to help understand the effects of changes on the crop/soil system. Such experiments also act as a physical demonstration of the key factors necessary to maintain food production.

What are the two or three most important findings from the research till now?

With sufficient input of fertilisers, lime and pesticides along with the use of new higher-yielding crop varieties, sustainable crop production can be achieved on the same site for generations. However, for optimum yields, inputs of fertiliser N which greatly exceed crop requirements and organic manure are not environmentally sustainable. Consequently, it is important to manage nutrient inputs, whether from mineral fertilisers or organic manures, to match crop demand as carefully as possible.

What is the best treatment for wheat yields—organic manure, inorganic fertilisers or a combination of both?

The Broadbalk experiment demonstrates that both mineral fertilisers and organic manures are beneficial for crop production. Wheat yields from plots under rotation, given farmyard manure plus mineral fertilisers or higher rates of mineral fertilisers alone, are similar. However, the annual farmyard manure inputs used on Broadbalk greatly exceed those which can be used in current commercial practice because of limited availability of manure.

Do you think there are any lessons for a developing and densely-populated country like India, where agriculture is one of the main occupations but is not lucrative enough?

The many differences between the climate and agriculture systems in Europe and India make it difficult to translate findings directly from the Rothamsted experiments. However, they demonstrate some principles common to all agricultural systems, including the importance of maintaining soil fertility and other aspect of soil health (organic matter content, pH, structure and biological activity) necessary to ensure global food security for a growing population in a changing climate.

phorus (P), potassium (K), magnesium (Mg), nitrogen (N)—was 2.85 tonnes per ha. Between 1890 and 1940, the field strips treated with both combinations resulted in almost similar yields. Between 1950 and 2019, the average yield with fertilisers was 4.9 tonnes per ha, while the average for FYM was 4.8 tonnes. But research showed that the use of organic manure had increased the soil organic matter content on some plots. “It also had beneficial effects on many soil properties, including fertility, structure and water holding capacity. This can make the soil more easily workable and decrease the energy required to plough it. It may also improve soil conditions for plant establishment and growth,” says Andy Macdonald, manager of Rothamsted Research’s long-term experiments (see interview, p14).

However the Broadbalk experiment indicates such benefits may not require large increase in soil organic matter. For instance, in temperate north-western European climates, modest applications of manure on a regular basis (once during crop rotation) may be sufficient to improve the health of soil, adds Macdonald.

A comparison of recent yield between 2016 and 2018 of both continuous and rotational wheat plots shows that the higher the amount of nitrogen, the greater is the yield. This was observed by comparing plots that received only FYM, those that received different amounts of N fertiliser (N1 to N6 with N1 having lowest amount of nitrogen and N6 the highest) and those that received same amounts of P, K and Mg. The highest average yield was in wheat treated with N6 fertiliser, grown in both continuous and rotational manner.



Among the findings include the fact that soil has the ability to act as a sink for methane

Although the difference in yield between wheat treated with FYM and N6 was not much in continuous plots, in the rotational plots, the average yield from FYM was 6.9 tonnes per ha as against 10.7 tonnes per ha from N6.

The finding shows that there is little benefit for farmers using fertiliser with such high levels of nitrogen. Also, since most of the nitrogen gets converted to nitrate, any residue not retained in soil may convert to nitrous oxide, a

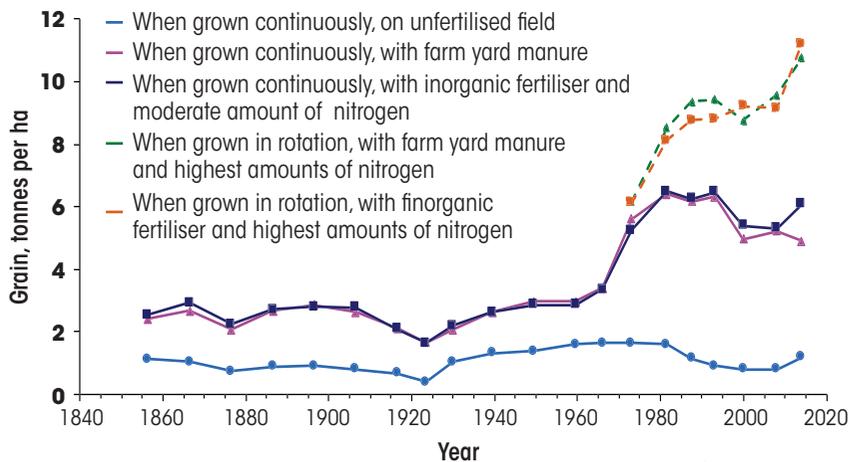
greenhouse gas that leaks when water drains through the soil.

Another significant finding of the ongoing experiment is about organic matter in the soil. A century after the experiments began, it was found that the amount of organic carbon (C) in topsoil (0-23 cm) in FYM-treated plots was more than double of that in fertiliser-treated plots.

Similarly, long-term changes in the total percentage of nitrogen concentration in the topsoil where

Towards optimum yield

Broadbalk average wheat yields improved from 1 tonne per hectare (ha) in 1843 to 9 tonnes in 2020; scientists aim to attain 20 tonnes by 2032



Source: Rothamsted long-term experiments, a 2018 report by Rothamsted Research, UK

winter wheat was grown in most years since 1843 were also tested. Between 1840 and 2010, nitrogen concentration in FYM treated plots was the highest, followed by a plot receiving both FYM and nitrogen fertiliser. Soil nitrogen concentration remained almost constant in the unfertilised plot (nil) and the plot given phosphorus-potassium since the start of the experiment.

The other aspect was the soil's ability to act as a sink for methane (CH₄). Preliminary findings showed less CH₄ is oxidised in the soil when nitrogen was applied as against soil receiving FYM or that with neither fertiliser nor manure.

In 2000, another important change was to withhold the P fertiliser from selected plots. Doing this allowed plant-available phosphorus to decline to a level which is suitable to achieve maximum yield without any detrimental effect on the soil.

The research has also emphasised the importance of good weed control to protect the yield. One of the 10 sections (section 8) was not given herbicides and its

comparison with other plots that received the same fertiliser as well as herbicides, showed that the mean yields were lower in the former. An assessment from 1985 to 2014 showed mean yield from section 8 was half of the yield from one another section.

With this knowledge, Rothamsted Research scientists have improved wheat yields from 1 tonne per ha since 1843 to 9 tonnes per ha in 2020 (see 'Towards optimum yield'), boosting Lawes' statement in his first Rothamsted paper in 1847, where he described Broadbalk soil as a heavy loam resting upon chalk, capable of producing good wheat when well manured. The current goal of the institution is to attain 20 tonnes per ha in 20 years under its 20:20 programme that began in 2012.

Calling Rothamsted the birth-place of systematic agricultural research, M L Jat, principal scientist with Mexico-based International Maize and Wheat Improvement Center, says, "We can learn a lot from these kinds of

experiments where they have been trying to find a balance in the use of chemical fertilisers for 176 years. Long-term experiments are really needed when the world is talking about evidence-based agronomy. We need to learn from these instead of taking decisions, political or otherwise, based on one or two years of research." Such experiments help in devising long-term strategies by putting together data from past climatic conditions and understanding what can help build soil health.

India has also been conducting its own long-term experiments, especially related to fertiliser and nutrient management. Long-term fertiliser experiments are being carried out at 17 Indian Council of Agricultural Research (ICAR) centres since 1970 to study changes in soil quality, crop productivity and sustainability. According to ICAR, these experiments show that it is not possible to sustain productivity without external supply of nutrients. The research has led to the development of integrated plant nutrient supply and management strategies for improving soil fertility, enhancing and sustaining productivity of intensive cropping systems—rice-wheat, rice-rice, maize-wheat, finger millet-maize, soybean-wheat and groundnut-wheat—in major soil groups of India. The results shows application of N alone has a detrimental effect on soil productivity, but a balanced use of NPK can help maintain organic carbon in soil. Jat says, experiments like these are assets to the nation. The database can help plan strategies, help policy-makers understand what is happening in the field and serve as capacity development play-farms, generating scientific evidence. **DTI**

 @shagun_kapil

SUBSCRIBE

DownToEarth

www.downtoearth.org.in

**The planet doesn't have a price tag
But, by subscribing to the magazine, you
pay a small contribution to reiterate this.**



Down To Earth - India's most credible magazine on environment and development. The magazine provides research-based knowledge and fills a critical information gap.

Down To Earth covers:

Climate Change | Health | Air | Food | Environment | Agriculture | Mining | Water | Natural Disasters | Urbanisation | Waste | Energy | Wildlife & Biodiversity | Economy | Science and Technology | Governance | Forests | Lifestyle
...with better insight into the issues, the same are critically analysed.

..... To know more and subscribe, please visit the following link and click to the applicable category

<https://www.downtoearth.org.in/subscription/pricing/1>

- | | |
|-------------------|--|
| Category 1 | Individuals, Schools and NGOs |
| Category 2 | Colleges, Government, Private and all others |

..... **Subscribe to Down To Earth with our Annual Issues to get the best deal!**

If you want to make payment by way of Cheque, please draw in favour of 'Society for Environmental Communications', fill up this form, and send to **Society for Environmental Communications, 41 Tughlakabad Institutional Area, New Delhi – 110062**

CONTACT DETAILS:

Subscriber's Name: Mr/Ms _____ Institution: _____
Address: Off Res _____ State: _____
Pin Code Phone: Off Res _____ E-mail: _____
Cheque No.: _____ Date: _____ Amount: _____

Write to us if you have any queries, addressed to Ramachandran at: rchandran@cseindia.org



All of Eurasia is warmer than usual; the La Niña winter pattern is bringing warmth to the Indian Ocean and the Arabian Sea as well

Uneasy spring

The world is heating up even in La Niña years that are associated with cooler temperatures

AKSHIT SANGOMLA NEW DELHI

MANGO TREES across the country this year are laden with dense clusters of greenish-white and pinkish flowers. In Uttarakhand and Himachal Pradesh, the rhododendron has painted the hills red and pink more than four weeks ahead of schedule. In Jammu and Kashmir, almond, peach and gul-tour (a yellow flowering herb), too, have flowered earlier than usual. But rather than spreading cheer, this early arrival of spring has raised concerns among scientists.

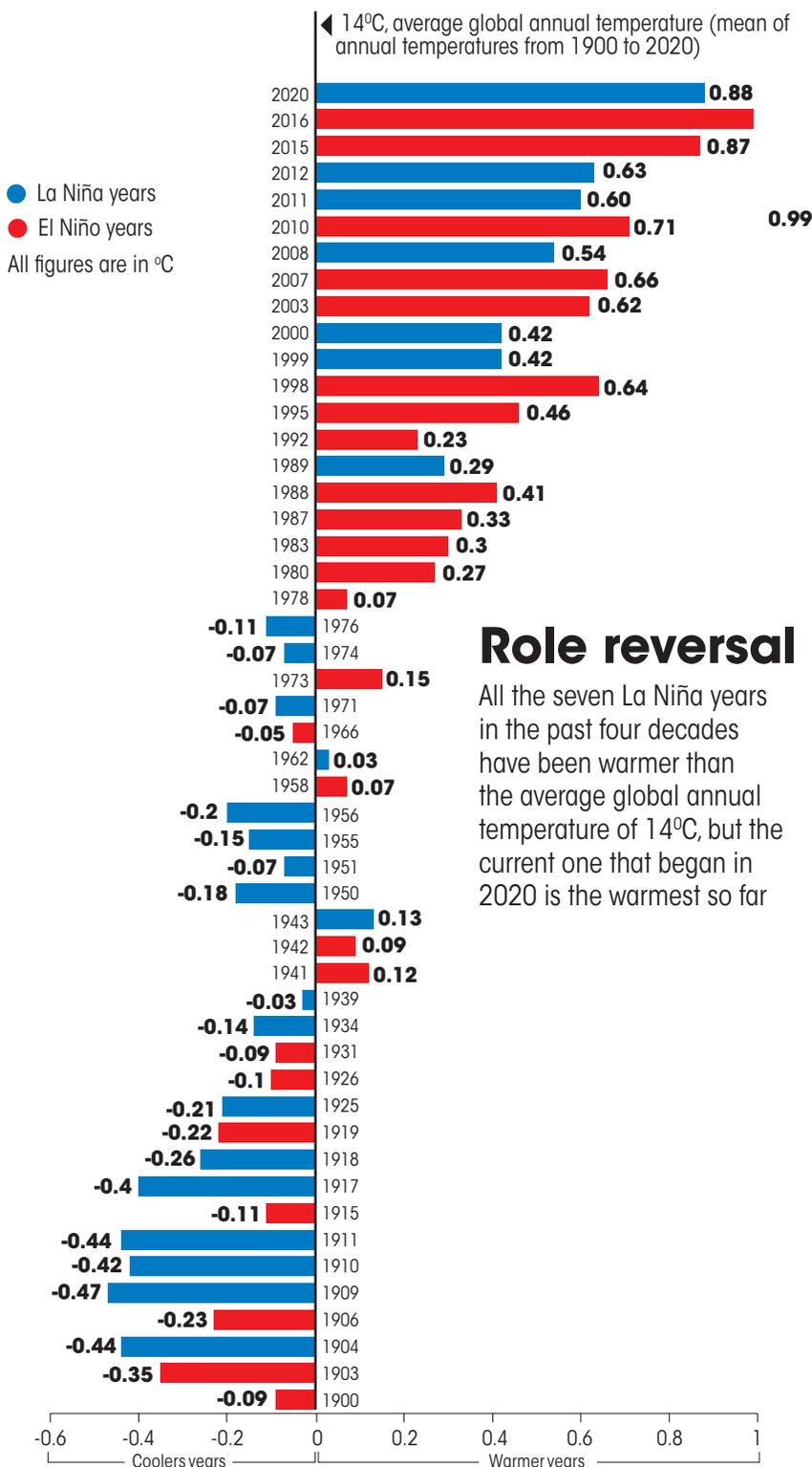
Such early flowering is usually associated with long exposure to light and heat, which is now sweeping the subcontinent. India

recorded its third hottest January and February in 2021. In terms of minimum temperatures, the first two months were the second hottest on record after 2016, suggests data with the India Meteorological Department (IMD). Maximum temperatures soared 5-7°C above normal in Odisha, Chhattisgarh and Jharkhand on January 9. On February 17, Jammu and Kashmir recorded a maximum temperature of 17.1°C, which is usually felt in March. In fact, an analysis of IMD data shows that on January 17, February 21 and 28, as many as 10 states and Union Territories across northern, eastern and western

India saw a spike of 5°C or more in their daytime temperatures. India also saw the third warmest March in 121 years. The warmest March was in 2010, followed by 2004.

But more than the rising temperatures, what has confounded scientists is their occurrence despite the prevailing La Niña conditions, which typically bring in strong cold winds from the Pacific Ocean and keep the mercury low across the subcontinent.

La Niña is one of three phases of the El Niño Southern Oscillation (ENSO), an important climate phenomenon over tropical Pacific Ocean that influences rainfall and



Role reversal

All the seven La Niña years in the past four decades have been warmer than the average global annual temperature of 14°C, but the current one that began in 2020 is the warmest so far

temperature patterns around the world. ENSO oscillates between La Niña and the warm El Niño phases, along with a neutral phase in the middle of the continuum. “Though the La Niña event appears to have peaked in October-November 2020, there is a 65 per cent likelihood that La Niña conditions will persist during February-April 2021,” says the World Meteorological Organization.

Yet, says Roxy Mathew Koll, climate scientist at the Indian Institute of Tropical Meteorology (IITM), Pune, all of Eurasia is currently warmer than normal and the La Niña winter pattern is bringing warmth to India as well. The Indian Ocean is much warmer than usual; the Arabian Sea is slightly warmer, says Koll.

An analysis by *Down To Earth* (DTE) shows that this pattern has been disrupted since the 1980s (see ‘Role reversal’). Between 1900 and 1980, there were 18 La Niña years and only two (1943 and 1962) were warmer than the average annual global temperature. There have been seven La Niña years since the 1980s, and in all of them the world has recorded higher temperatures than the average annual of 14°C.

DTE analysis further shows that on seven occasions since 1950, La Niña years have been warmer than El Niño years. And since 1980, every successive La Niña year has only been warmer. The La Niña in 1989 was 0.29°C warmer than the annual average. During the next La Niña event in 1999-2000, the world was 0.42°C warmer. The 2008 La Niña was 0.54°C warmer. During 2011 and 2012 La Niña events, the world was 0.6°C warmer. The current La Niña year, which began in 2020, is the warmest on record. Is it indicative of a greater fluctuation in the climate? [DTE](#) [@Aks7489](#)



CHALLENGE



India has enhanced its global standing by supplying COVID-19 vaccines to rich and poor countries alike. It must now scale up its manufacturing by roping in public sector units to cement its position in the changing geopolitics

VIBHA VARSHNEY NEW DELHI

IT'S DIFFICULT to fathom how in this protracted war against the pandemic, the virus, SARS-COV-2, has managed every time to gain the upper hand over humanity, its ingenuity and its scientific breakthroughs. In the beginning, the world scrambled to decode the novel virus and its infection strategies and to churn out enough personal protection equipment, hand sanitisers, ventilators and other medical supplies. Then it was the race to develop worthy vaccines in record time. Despite humanity successfully crossing these hurdles, the novel coronavirus disease (COVID-19) continues to rage and the world now stares at yet another challenge of vaccinating everyone well in time.

Consider these numbers. Till April 8, only 711 million jabs had been administered across the world, as per the Johns Hopkins University, US. This has ensured complete inoculation of a little more than 2 per cent of the world's adult population. According to data analytics company Airfinity, the world will manufacture 9.5 billion doses by the end of 2021. It, however, needs over 14 billion doses as soon as possible to vaccinate its entire adult population. This is almost three times the number of vaccines the world was producing in the pre-pandemic period for other diseases, as per vaccine alliance GAVI.

A worried pharmaceutical industry met on March 8 and 9 at the Global COVID-19 Vaccine Supply Chain and Manufacturing Summit in London, UK, to iron out production glitches and distribution snags in the vaccination drive. "We must urgently work together to prevent shortages from slowing the delivery of the vaccines we need in order to end the pandemic," said Richard Hatchett, chief executive of the Coalition for Epidemic Preparedness Innovations (CEPI), a non-governmental organisation based in Oslo, Norway, at the summit.

But the pharmaceutical companies are not used to sharing and this fault line has been clearly exposed by the pandemic.

To ramp up production and ensure a smooth supply, the World Health Organization (WHO) has spelt out some clear steps

"We must urgently work together to prevent shortages from slowing the delivery of the vaccines"

RICHARD HATCHETT

CHIEF EXECUTIVE OF THE COALITION FOR EPIDEMIC PREPAREDNESS INNOVATIONS (CEPI)

for the pharmaceutical companies. The first one is waiving patents and intellectual property rights (IPRS) so that countries with vaccine manufacturing capacity can immediately start production. Yet in October 2020, when India and South Africa put forth a proposal before the World Trade Organization (WTO) to temporarily suspend IPR on COVID-19 vaccines, not a single developed country supported the move.

The other WHO recommendation requires maximum partnerships among pharmaceutical companies and bilateral technology transfers to ramp up production. While private firms are entering into partnerships, it is only to maximise profits. AstraZeneca, for instance, has entered the maximum partnerships with 26 firms in 15 countries. But the alliances have been forged without much transparency and the partnerships have been mostly with the developed world.

This is what was sensed by WHO way back in May 2020, when vaccines were still under development. It had then created a COVID-19 Technology Access Pool (C-TAP) to encourage companies to share their know-how with manufacturers in lower-income countries, but not a single company signed up for it. In fact, on May 28, a day before C-TAP was to launch, pharmaceutical multinationals like Pfizer, AstraZeneca and GlaxoSmithKline ridiculed the initiative publicly. "At this point in time, I think it is nonsense, and also dangerous," said Pfizer chief executive Albert Bourla at an online forum organised by industry body International Federation of Pharmaceutical Manufacturers & Associations. AstraZeneca chief executive Pascal Soriot argued that intellectual property (IP) is "a fundamental part of our industry and if you don't protect IP, then essentially, there is no incentive for anybody to innovate".

Such claims by the industry are ludicrous as all the 13 COVID-19 vaccines that are currently in the market have drawn heavily on public funding for development. The Moderna vaccine, mRNA-1273, is based on a technique that was developed at a public-funded university lab. The company in

February said it will earn US \$18.5 billion from its vaccine this year. Even AZD1222, the most popular vaccine in the market right now, was developed at the Oxford University in the UK with the idea of free use by all. Later, on the recommendation of the Bill & Melinda Gates Foundation, the University signed over exclusive rights to British-Swedish company AstraZeneca. The private company further signed a contract with the Serum Institute of India (SII), which is now manufacturing the vaccine under the name Covishield.

The attitude of rich countries is no better (see ‘An unequal world’, p23). At a time when almost 50 countries, mostly in sub-Saharan Africa, are yet to administer their first shot, a CEPI report published in March shows wealthy and middle-income countries have booked more than two-thirds of the vaccines that companies promise to produce by the end of the year. The remaining doses would cover as little as 28 per cent of the populations of 92 of the world’s most impoverished nations. In fact, rich countries are deliberately holding on to their own doses knowing very well that the virus can be controlled only by suppressing its transmission everywhere at the same time.

Till March-end, China had manufactured the most COVID-19 vaccines, followed by the US, India, EU and the UK. The US and the UK have kept all their vaccines for domestic consumption. The EU nations are sharing the vaccine within themselves. Call it a tactic to forge diplomatic relations or plain empathy, at present, China and India are the only countries exporting almost half of their vaccines to others, mostly those in the developing and underdeveloped world.

INDIA RISING

Global shortage and India's smart diplomacy are likely to work in the country's favour

Till the pandemic struck the world, India was the world leader in vaccine production. Its pharmaceutical companies used to churn out 60 per cent of the vaccines required for the global immunisation programmes. “This was in part been possible because, in recent

years, the country has excelled at providing high-quality medicines at low prices by utilising the economies of scale, and the work of many very innovative companies such as SII who have found ways to produce products at lower cost than elsewhere,” says Anthony Mc Donnell, senior policy analyst, global health, Center for Global Development in Europe. In terms of COVID-19 vaccine manufacturing, the country has now lost the supremacy. Yet, it seems to be doing better.

“Under Vaccine Maitri initiative, India has provided 60 million doses of COVID-19 vaccines to 70 countries including the UK, Brazil, Morocco and Bangladesh,” says Sudarshan Jain, secretary-general of the Indian Pharmaceutical Alliance that represents 24 Indian pharmaceutical companies. The country’s vaccine export efforts have helped strengthen external relationships with neighbours in South Asia, he says.

India, in fact, is faring better than the other Asian giant, China, which is now the top vaccine maker.

In May 2020, just a month before rolling out its COVID-19 vaccine Convidecia, the first in the world, China had announced that it was for “global public good”. Since then China has shipped vaccines to 35 countries, but has used it as a business opportunity, write Ivana Karásková and Veronika Blablová, researchers at Association for International Affairs in Prague in an article published on March 24. There is some concern that China does not treat its customers equally. “Some countries received vaccines in the form of donations, while others purchased them or were offered a loan to buy them—an alternative aimed primarily at the Latin American and Caribbean countries,” say Karásková and Blablová.

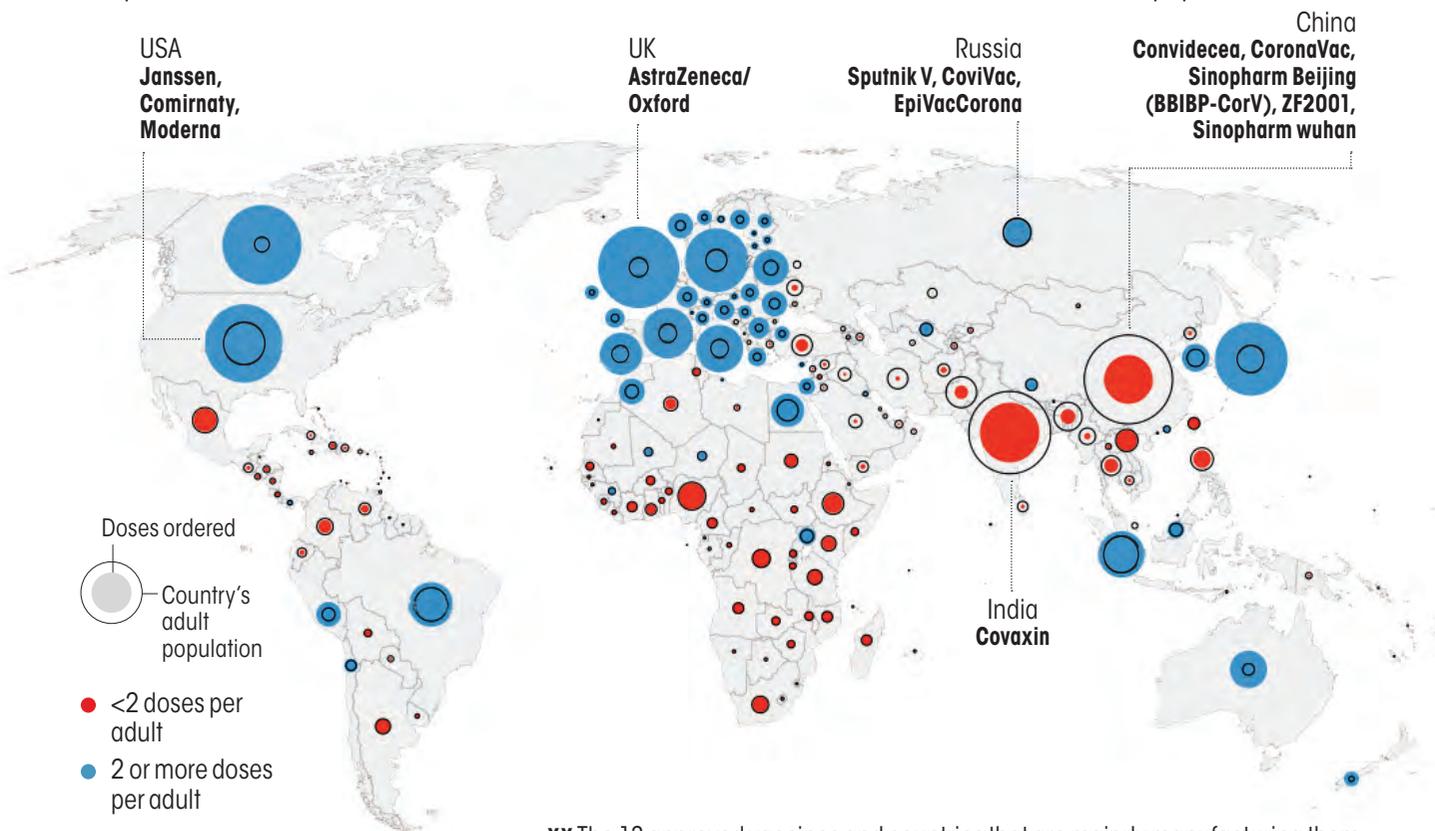
India was quick when China failed to deliver 300,000 doses to Myanmar, and supplied 1.7 million instead. In Nepal, both China and India offered vaccines, but only India provided additional vaccines. Bangladesh also opted for Indian vaccines after it refused to co-fund Chinese vaccine trials. India promptly delivered a batch of COVID-19 vaccines to Brazil after its president

“Under Vaccine Maitri initiative, India has provided 60 million doses of COVID-19 vaccines to 70 countries including the UK, Brazil and Morocco”

**SUDARSHAN JAIN
SECRETARY-GENERAL
OF THE INDIAN
PHARMACEUTICAL
ALLIANCE**

AN UNEQUAL WORLD

Only rich countries have been able to order more than two doses of vaccine for each of their adult population



XX The 13 approved vaccines and countries that are majorly manufacturing them

Source: Johns Hopkins University and McGill COVID19 Vaccine Tracker Team

Jair Bolsonaro rejected a deal of 46 million doses being developed by a Chinese company, saying that the “Brazilian people will not be anyone's guinea pig”. India is also the major supplier to COVAX, a global initiative aimed at equitable access to COVID-19 vaccines led by UNICEF, GAVI, WHO, CEPI and others. The country provides more than 80 per cent of doses for the initiative, which particularly aims to supply vaccines to poor countries.

India has another advantage. Since the country has been providing a major chunk of the vaccines needed for immunisation programmes across the world, the quality of its supplies is established. Compared to this, China is secretive about scrutiny and quality is doubtful. “China is out of fashion politically too,” says S Srinivasan, managing trustee of LOCOST, a generic drug company.

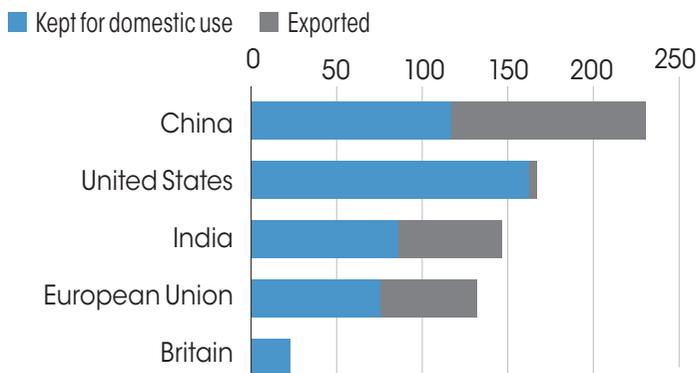
As a result, several multinationals are interested in manufacturing their vaccines

in India. Russia is already in talks with at least five Indian companies to manufacture 850 million doses of Sputnik V vaccine by 2021. Hyderabad-based Dr Reddy's Laboratories has carried out clinical trials for Sputnik V and has applied for an emergency use authorisation (EUA) licence in India. On March 12, the US International Development Finance Corporation, the country's development bank, announced it will help Hyderabad-based firm Biological E manufacture 1 billion doses of COVID-19 vaccines by 2022. This portfolio is likely to include Ad26.cov2.s vaccine by Johnson & Johnson, which is already approved in 37 countries. “There are several prominent Indian companies such as Zydus, Genentec (Emcure), and Wockhardt that are working towards entering the COVID vaccine market,” says Mahesh Doshi, president of the Indian Drug Manufacturers' Association.

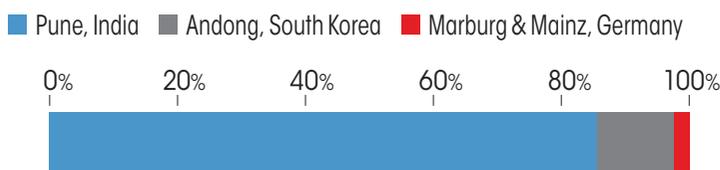
SUPPLY IS ALL ABOUT ATTITUDE

The US and the UK are not sharing their vaccines with other countries

Covid vaccines produced by top 5 countries/regions, in million doses



India alone to provide over 80 per cent of the doses for **Covax initiative** set up to supply vaccines to poor nations



Source: Airfinity, as on March 29, 2021

These deals are expected to increase the country's vaccine manufacturing capacity substantially in the coming days, helping India regain its position.

STILL NOT ENOUGH

Indian firms face the tall order of ramping up production to meet increased demand here and abroad

India's pharmaceutical industry is being flooded with deals at a time when the country is in the middle of a second wave of COVID-19 infections—this time, the rate and pace of infection are much higher than what India witnessed during the first wave that lasted from June to September 2020—and has fully immunised barely 0.8 per cent of its adult population with double doses of the vaccine; another 8.5 per cent have received a single dose till the first week of April, as per data with the Johns Hopkins University. There are reports of shortages across the country—from Odisha, Gujarat, Rajasthan and Maharashtra. The two Indian manu-

facturers are producing about 70 million doses a month right now. The country, however, needs around 90 million doses every month to ensure the vaccination drive continues without a glitch.

This strain on India's vaccine industry is being felt both within the country and abroad. On March 25, GAVI notified that deliveries of Covishield will be delayed in March and April. Though the government says it has not put any restriction on exports, Adar Poonawalla, chairperson of SII, claims that this shortage has happened because of increased domestic demand. In a recent interview, he suggested that the government should pay ₹3,000 crore to the company to ramp up its production.

Bharat Biotech, the lone Indian company with exclusive manufacturing rights of COVAXIN, is also struggling to cater to the growing demand. This is a cause for concern as the vaccine is the easiest to scale up because it has been developed by the Indian Council of Medical Research (ICMR), the country's apex body for formulation, coordination and promotion of biomedical research. On March 17, the Union health ministry set up a six-member inter-governmental panel to explore to look at ways to ramp up vaccine production. "Among other things, we have suggested Bharat Biotech and SII to set up more sites or repurpose the existing facilities to produce the vaccine," says Samiran Panda, head of epidemiology and communicable diseases division at ICMR, who is part of the panel. Bharat Biotech has subsequently announced that it will increase its production by seven-fold by manufacturing COVID-19 vaccine at its facilities in Malur in Karnataka and Ankleshwar in Gujarat. It is currently being produced at the company's Hyderabad facility.

PUBLIC OVERSIGHT

Existing pharma PSUs in India have all the infrastructure, scientists and technicians for vaccine production

During this scramble for more and more vaccines, India's seven public sector vaccine



▲ Medical staff at Ahmedabad district of Gujarat unload vaccines. India sees a surge in domestic demand for vaccines as it battles a second wave of COVID-19

manufacturing institutes are sitting idle (see ‘Mighty seven’, p26). They have ensured vaccine security for India for decades. These include the Central Research Institute (CRI) in Himachal Pradesh, BCG Vaccine Laboratory (BCGVL), Pasteur Institute of India (PII) and HLL Biotech in Tamil Nadu, Bharat Immunologicals and Biologicals Corporation Limited, Uttar Pradesh, Haffkine Bio-Pharmaceutical Corporation Limited, Maharashtra, and Human Biologicals Institute, Telangana.

In 2008, the Union government cancelled the manufacturing licences of three of these public sector undertakings (PSUs)—CRI, BCGVL and PII—for not meeting good manufacturing practices under the Drugs and Cosmetics Rules 1945 (see ‘Deliberate?’, p29). The three PSUs, set up in pre-Independence India, were reopened in 2012 because of public interest petition in the Supreme Court, and castigation by two parliamentary committees on health. In July 2019, Union health minister of state Ashwini Kumar Choubey said the units were in different stages of vaccine production for supplying to the

country’s Universal Immunisation Programme. But the data provided by him suggests otherwise.

CRI discontinued production of tetanus toxoid in 2018-19. PII, which has an installed capacity of 60 million doses per annum of combination DPT vaccine, 55 million doses per year of tetanus toxoid vaccine and 15 million doses per year of diphtheria vaccine, has not produced a single dose since 2016. Similarly, BCGVL’s manufacturing plant in Guindy, Tamil Nadu, has not produced a vial between 2016 and 2020, despite an installed capacity of 80 million doses of BCG vaccine a year. The first batch of 450,000 doses was only rolled out in July 2020. The Centre has assigned a new role to CRI. When the Sputnik V and AstraZeneca vaccines came to the country, it carried out safety tests on them before they were allowed to be used in a clinical trial. The PSU also provides adverse events following immunisation (AEFI) assessment services to the government.

Public health experts question ICMR’s decision to partner with a private firm alone for manufacturing COVAXIN. “The

MIGHTY SEVEN

The government has not considered any of its institutes for manufacturing COVID-19 vaccines



Institute's name	Vaccines it can produce	Ministry/department
Bharat Immunologicals and Biologicals Corporation Limited, Bulandshahr, Uttar Pradesh	Oral poliovirus vaccines (OPV)	Department of Biotechnology, Ministry of Science and Technology
Haffkine Bio-Pharmaceutical Corporation, Mumbai, Maharashtra	OPV, Antitoxin (tetanus, diphtheria), sera (rabies, antiscorpion), snake antivenin	Government of Maharashtra undertaking
Human Biologicals Institute, Hyderabad, Telangana	Rabies, DPT, Tetanus toxoid (TT), Diphtheria (DT) and Hepatitis B	National Dairy Development Board
HLL Biotech Ltd, Chennai, Tamil Nadu	Hepatitis B, DTWP-HepB-Hib	Ministry of Health and Family Welfare
BCG Vaccine Laboratory, Guindy, Tamil Nadu	BCG, Tuberculine	Ministry of Health and Family Welfare
Central Research Institute, Kasauli, Himachal Pradesh	DTP, TT, DT, Japanese encephalitis and yellow fever	Ministry of Health and Family Welfare
Pasteur Institute of India, Coonoor, Tamil Nadu	DPT, TT, DT and Inactivated rabies vaccine	Ministry of Health and Family Welfare

Source: Directorate General of Health Services

government can ask Bharat Biotech to transfer the technologies to PSUs and other private companies in the country through the provision of compulsory licensing," says Malini Aisola of the All India Drug Action Network, an alliance of non-profits working towards improved access to essential medicines. With a little investment, these PSUs can enhance the production capacity of COVID-19 vaccines, says K M Gopakumar of Third World Network, an advocacy organisation. "We need political will to make this happen," he adds.

It is not that people have forgotten about PSUs. On March 17, Maharashtra's chief minister Uddhav Thackeray at a video-conferencing asked Prime Minister Narendra Modi to allow the transfer of COVAXIN technology to state-owned Haffkine Institute in Mumbai. For this, the institute would need money to upgrade and has asked for funds from the centre under the recently launched Mission COVID Suraksha. The Centre has not yet given a go-ahead.

The country also has a state-of-the-art Integrated Vaccine Complex based in Chengalpattu, Tamil Nadu that has been lying idle since its inauguration in 2016. The Centre came up with the idea of the 40-hectare complex in 2008 after the manufacturing licences of the three PSUs were cancelled. The facility was meant to be the nodal centre for manufacturing, research and supply of vaccines at affordable prices under the government's Universal Immunisation Programme. So far, it has not developed a single vaccine. In January 2020, Bharat Biotech offered to provide ₹600 crore to revive the complex. The discussions did not move forward. On January 9, 2021, just days before India's vaccination drive began, Union Minister of Health and Family Welfare Harsh Vardhan visited the plant to inspect the facilities. On January 16, 2021, HLL Lifecare Limited, the PSU that is running the complex through its subsidiary HLL Biotech Ltd, issued an expression of interest from vaccine manufacturers to use the plant. "The facility has the infrastructure, trained technicians and scientists for the production of vaccine and could contribute in the production of COVAXIN," says C S Rex Sargunam, president of the Tamil Nadu Health Development Association, a non-government organisation.

A GLOBAL RUT

Several countries weakened their public institutes in the 1980s. They are feeling the pinch now

India is not the only country where the public sector has been sidelined. Stuart Blume, professor emeritus at the Faculty of

KNOWLEDGE SHARING TO ENSURE CONTINUOUS LEARNING



There is a 76% survival rate for children fighting cancer in India when they receive good medical treatment. But due to extensive treatment and chemotherapy sessions, these kids miss out on going to school or continuing their education. Providing educational support to these kids while they undergo treatment at the hospital boosts their morale and helps them return to school with dignity and confidence.

Himalaya is supporting Samiksha Foundation, a creative learning initiative for children with cancer and their caregivers. Samiksha has centers at the Kapur ward in Kidwai Memorial Institute and Mazumdar Shaw Cancer Center, Narayana Health, Bengaluru.

The initiative focuses at motivating these children by providing them with educational, creative, and spiritual support while they undergo treatment. As part of the curriculum, the children are taught yoga, meditation, art, and have access to a multilingual library with a plethora of books. Storytelling sessions are also conducted to make these knowledge-sharing activities more engaging and are very popular among the children at the hospitals.

Himalaya has been actively associated with Samiksha Foundation from 2016 and has supported around 1800 children so far. Children getting admitted to these hospitals for cancer treatment can enroll with Samiksha and avail all the facilities provided to help them continue with their education.

Himalaya has always been committed to addressing primary and community healthcare challenges. Through initiatives such as comprehensive community health camps, we have strived to take care of the basic healthcare needs of socially and economically marginalized groups. We have also worked towards spreading awareness about menstrual hygiene management, WASH (Water, Sanitation and Hygiene), CHD (Congenital Heart Disease), zero hunger, and cleft-lip treatment.



Social and Behavioural Sciences in the University of Amsterdam, the Netherlands, explains that the 1980s saw the rise of neoliberal thinking and privatisation of health services. “Experts in the 1980s insisted on patents and intellectual property rights that were harmonised across the globe. This is what the pharmaceutical industry wanted too,” he says.

Now, COVID-19 has given the public sector a second chance, as countries are realising profit-driven private players might not be enough during a crisis. In Canada, efforts are underway to manufacture vaccines domestically. This realisation came when after identifying a vaccine candidate, the country realised it did not have the manufacturing capability to create its components. Similarly, Cuba has started developing its own vaccine after it failed to pre-book enough doses. The first million doses of Soberana 02 vaccine are expected to be released in late April. The country is developing three more vaccine candidates: Soberana 01,

^
A nurse in Myanmar shows a vial of Covishield vaccine flown from India, on April 6

Mambisa and Abdala. China and Russia have also developed vaccines through the public sector.

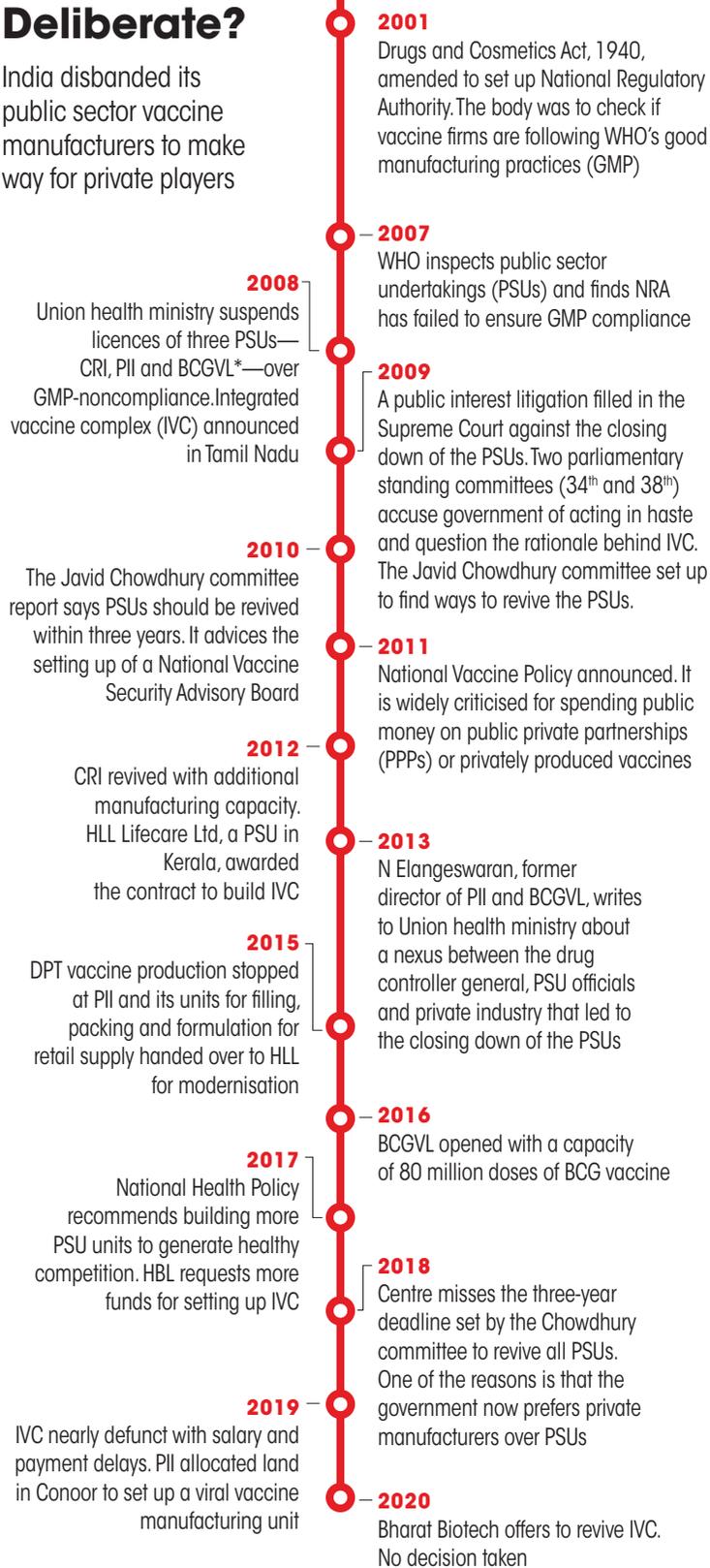
“In India, the public sector should be revived to its full capacity with adequate support to strengthen its inherent strengths on expertise and skilled human resource,” says Y Madhavi, researcher at the Council of Scientific and Industrial Research–National Institute of Science, Technology And Development Studies.

This may not be as straightforward as the character of the PSUs has changed over time. “The institutes we used to have can’t be reconstituted in today’s climate. A new model, a good example for the world, isn’t readily available,” Blume says. The character of immunisation has also changed in India. The country now prefers combination vaccines in the Universal Immunisation Programme and the old PSUs do not have the necessary infrastructure for that. Most new vaccines are also under patents, making it difficult for the PSUs to make them.

Officials with the Union health ministry

Deliberate?

India disbanded its public sector vaccine manufacturers to make way for private players



*CRI-Central Research Institute, Kasauli, Himachal Pradesh; BCGVL-BCG Vaccine Laboratory, Guindy, Tamil Nadu; PII-Pasteur Institute of India, Coonoor Tamil Nadu
Source: CSE-DTE Data Centre

did not respond to *Down To Earth's* queries on whether it is looking at the public sector to augment vaccine production. The private players also refused to comment on whether they are considering PSUs for collaboration.

Madhavi says complete dependence on private industry is a mistake. There are examples where private players have failed to deliver. In 2015, a lack of vaccines led to an outbreak of Japanese encephalitis in Uttar Pradesh. "Currently, 80 per cent of the Indian government's need for vaccines is met by private firms in India and abroad. The prices are up to 250 per cent higher than those of the public sector, as a result pushing India's immunisation budget up seven times in only five years," she says.

The major fault line in the health sector that the current crisis has exposed is the absence of good policies. India, for example, has two guiding health documents and they both have opposing views. India's National Vaccine Policy 2011 encourages public-private partnership, but its National Health Policy 2017 focuses on building more public sector manufacturing units to generate healthy competition, uninterrupted supply of quality vaccines and anti-sera. On ground, only privatisation is happening. The way to move forward would be to provide a level playing field for both public and private sectors with around 50 per cent of vaccine production to remain with the public sector. All vaccines which are of national importance should be reserved for the public sector. says Madhavi. This would help in another way. The focus on COVID-19 vaccine could take away resources from the vaccines used in the Universal Immunization Programme and routine immunisation in children could be derailed. While the private is busy fighting the pandemic, the PSUs could at least avert this shortage.

The COVID-19 situation clearly shows that countries, not the pharmaceutical companies, need to play a pivotal role. This must be addressed now. The world cannot wait for another pandemic to do the same. **DTE**

 @vibhavarshney

OKADA ASSOCIATION
STOP CORONA !!

Practice Social Distancing



VACCINE APARTHEID



AFRICA IS WITNESSING A SECOND WAVE OF COVID-19, BUT LESS THAN 2 PER CENT OF THE 690 MILLION VACCINE DOSES ADMINISTERED TO DATE GLOBALLY HAVE BEEN IN AFRICA. THE WORLD WILL DO WELL TO REMEMBER THAT NO COUNTRY IS SAFE TILL EVERYONE GETS INOCULATED

A report by Kiran Pandey and Vibha Varshney from New Delhi, with Maina Waruru from Kenya; Christophe Hitayezu from Rwanda; Bennett Oghifo from Nigeria; Elsabé Brits from South Africa; and Mekonnen Teshome from Ethiopia

ONE OF South Africa's leading virologists and member of the country's Network for Genomic Surveillance in South Africa (NGS-SA), Carolyn Williamson, still remembers the telephone call in November 2020. "A worried Tulio de Olivera, head of NGS-SA, called me to inform on his discovery of a new variant of the novel coronavirus causing COVID-19. He told me about this variant's unexpected number of mutations in the spike protein that the virus uses to infect human cells," he recalls. NGS-SA had identified the variant, later named 501y.V2, through analysis of 2,882 whole genomes from South Africa. Within a month of the variant's discovery in the Eastern Cape Province of the country, COVID-19 cases spiked. The new variant is up to 50 per cent more transmissible, say experts. "By December, this virus variant had essentially replaced the previously circulating ones," Williamson told *Down To Earth* (DTE). The country formally declared this as the second wave of the pandemic in December 2020. After further investigations, experts estimated that the new wave caused by the variant actually started around October 2020. It was notably rapid in parts of the Eastern Cape, Western Cape and KwaZulu-Natal Provinces.

By January 2021, the second wave turned widespread and deadly. According to the World Bank's *Africa Pulse* report,

released on March 31, 2021, "The number of confirmed cases in South Africa increased from 14,109 per million people on December 10, 2020 to a peak of 24,435 per million people on January 30, 2021. Meanwhile, fatalities grew from 384 per million people to 741 per million people over the same time period." This was the highest among the 54 African countries.

The new variant is now the predominant one, being responsible for 90 per cent of all positive cases in South Africa, says a study released by KwaZulu-Natal Research and Innovation Sequencing Platform, South Africa, on January 17. Though the second wave has waned since the last week of March, there are fears of a third wave in the weeks after Easter, which is a popular vacationing time in the country.

Africa is second only to Europe, as far as number of countries witnessing a second wave of COVID-19 is concerned. By end of December 2020, some 40 countries had experienced the second wave (see 'Unwanted peaks' on p42), while four countries—Kenya, Nigeria, South Africa and Egypt—had entered into the third wave. The second wave, which started in South Africa with the new variant, and spread across the continent was a turning point in the pandemic's trajectory. It resulted in a higher number of weekly cases in at least half of the African countries since October 2020.



"As long as the pandemic continues to rage among unvaccinated populations, spawning new, more virulent, vaccine-resistant strains, no one is safe... the longer we keep the virus around the more mutations we'll see... If Africa is not vaccinated and we are a source of mutations, we put the whole world at risk"

PHIONAH ATUHEBWE

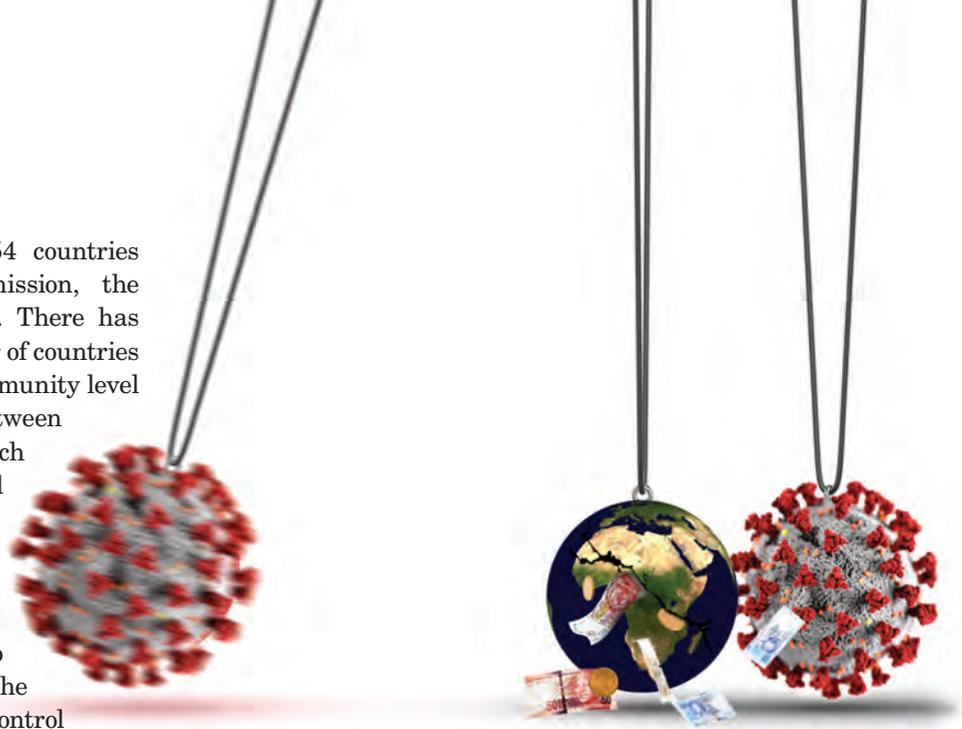
NEW VACCINES INTRODUCTION MEDICAL OFFICER ON THE CONTINENT FOR THE WORLD HEALTH ORGANIZATION

With 50 of the continent's 54 countries reporting community transmission, the spread has become unbridled. There has been an increase in the number of countries with spread of the virus at community level by over 20 percentage points between mid-July 2020 and end of March 2021, an analysis of World Health Organization (WHO) data shows. When WHO declared COVID-19 a pandemic on March 11, 2020, Africa had just 47 confirmed cases and no deaths. As of April 7, 2021, the African Centre for Disease Control has reported over 4.3 million infections and more than 0.1 million deaths linked to COVID-19.

The second wave has made the continent the weakest link in the global fight against the scourge. The resurgence of the infection might just prolong the pandemic. On May 7, 2020, a WHO research based on prediction modelling warned that the continent may have a prolonged outbreak over a few years and the pandemic will continue to smoulder with occasional flare-ups. This is worrying because the pandemic's first wave in the continent, witnessed in mid-July 2020, did not have much impact.

FIRST WAVE, NO RIPPLES

Egypt reported the first case of COVID-19 in Africa on February 14, 2020, nearly a month before WHO declared it as a pandemic. Four days later Nigeria reported its first case, becoming the first country in Sub-Saharan Africa to have come under the grip of COVID-19. "The spread of COVID-19 in Africa seemingly started predominantly from the northern region, particularly Egypt, Algeria, Morocco and Tunisia, with only Nigeria and Senegal reporting their first cases within the first 20 days of the outbreak in Africa. It is also noteworthy to observe the trickle nature of onset as it was observed across the globe, essentially, all the countries where the first cases were reported had only 1 case for the day for the first 26 days of the outbreak in Africa," says "Geographical



trend analysis of COVID-19 pandemic onset in Africa", published online in *Social Sciences & Humanities Open*, published on March 4, 2021. Even in the second wave, as of April 6, 2021, Africa has 3,199 cases per million. This is less than one-fifth of the global figure. Similarly, Africa has 85 deaths per million compared to 368 deaths per million globally. This low infection and low fatality in the second most populated continent, with over 1.3 billion people and a poor health infrastructure, is an epidemiological puzzle.

Among the most often cited reasons for the low incidence of COVID-19 in Africa is the continent's young population. As much as 40 per cent of Africa is younger than 14 years. In the US, eight of 10 COVID-19 patients deaths have been in people above the age of 65 years. A modelling study published in the *BMJ Global Health* journal on May 25, 2020 suggests that the large youth population might lead to more infections but most of these infections would be asymptomatic or mild, and would probably go undetected.

The old and vulnerable population in Africa escaped the virus due to a common cultural practice. "The elderly tend to move to the rural areas once they retire. These areas are less densely populated hence there is lower risk of contracting the disease than in more developed countries where the elderly are in specialised centres such as



“We are dealing with a new virus and while we have learned a lot in the last one year, there is still so much to understand about the disease pattern. We are detecting cases with the variant of concern B.1.1.7 that is associated with increased transmissibility”

CHIKWE IHEKWEAZU

DIRECTOR GENERAL, NIGERIA CENTRE FOR DISEASE CONTROL

retirement homes,” Borna Nyaoke-Anoke, senior clinical project manager at Drugs for Neglected Diseases initiative, Nairobi, Kenya, told DTE.

Also, the rural areas are safer because the disease has not spread there. Since road networks across the continent are underdeveloped and travel costs are high, people's movement is restricted. “We know the virus transmits better indoors and that crowding and close contact (which is more common in urban areas) is risk factor for infection,” says Francisca Mutapi, professor in Global Health Infection and Immunity at the University of Edinburgh and deputy director of Tackling Infections to Benefit Africa Partnership.

The hot and dry climate is thought to reduce transmission too. A study published on June 1, 2020, in the *American Journal of Tropical Medicine and Hygiene* analysed the data available on five reasons—low seeding rate (low number of coronavirus introduced into the continent because of low volume of air travel), effective mitigation measures, young population, favourable weather, and possible prior exposure to a cross-reactive virus (one theory says people infected by other coronaviruses could have developed immunity to COVID-19, too)—that could be responsible for low incidence and concluded that a combination of these factors is likely behind the low transmission and reduced disease severity in Africa.

Apart from the demography and geography, people in Africa also seem to have hit the genetic jackpot. Studies show that those who have remnants of the Neanderthal genome in their genes can be more susceptible to RNA viruses like SARS-CoV-2. Since Neanderthals were never in Africa, Africans do not have those genes.

Africa also has a behavioural advantage, having battled epidemics such as Ebola for years. Countries, therefore, could swiftly introduce measures such as social distancing, wearing face masks, frequent hand-washing, avoiding handshakes and restrictions on movements. “This is indeed a very plausible and often downplayed possibility,” says Samuel Oji Oti, senior program specialist with the Global Health Program Division of Canada's International Development Research Centre.

Oti cites the case of Liberia. This small country on the western coast of Africa was severely hit by an Ebola outbreak in 2014, but has managed to remain largely unaffected by COVID-19 (see 'Two extremes' on p36). “Thousands of community volunteers that had been trained and mobilised during the Ebola outbreak were almost immediately activated and deployed towards grassroots sensitisation for COVID-19,” says Oti. Additionally, Africa still has a low burden of non-communicable diseases which are associated with higher COVID-19 mortality. This might account for

A **Down To Earth** ANNUAL

STATE OF INDIA'S ENVIRONMENT 2021

Country's most credible annual statement on the state of affairs in environment and development sectors.

This is the much awaited 8th edition in our popular SOE Annual Issue series. Professionals, Academics, Consultants and Decision makers, as well as Students especially those preparing for competitive exams like the Civil Services, look forward to this yearly update and SOE 2021 would be another collector's edition.



PRICE
~~Rs.600~~
Rs.350

FOCUS

- A year after COVID-19 pandemic
- State of the states
- The Decade of Biodiversity

IT COVERS:

Climate change |
Agriculture |
Energy | Water |
Sanitation | Waste |
Industry | Habitat |
Air pollution |
Forest & Wildlife |
Data Dives

YOU CAN RESERVE YOUR COPY NOW !!!

Please place your order online by visiting us at

www.downtoearth.org.in/books

or mail your order along with a Cheque for the required amount, drawn in favour of 'Society for Environmental Communications', to:
Society for Environmental Communications,
41, Tughlakabad Institutional Area, New Delhi - 110062

fewer cases or deaths. For instance, WHO data says while the global prevalence of diabetes among adults over 18 years was 8.5 per cent in 2014, the figure for Africa was at 3.9 per cent, as per the International Diabetes Federation, a group of national diabetes associations in 170 countries.

NEW STRAINS LED 2ND WAVE?

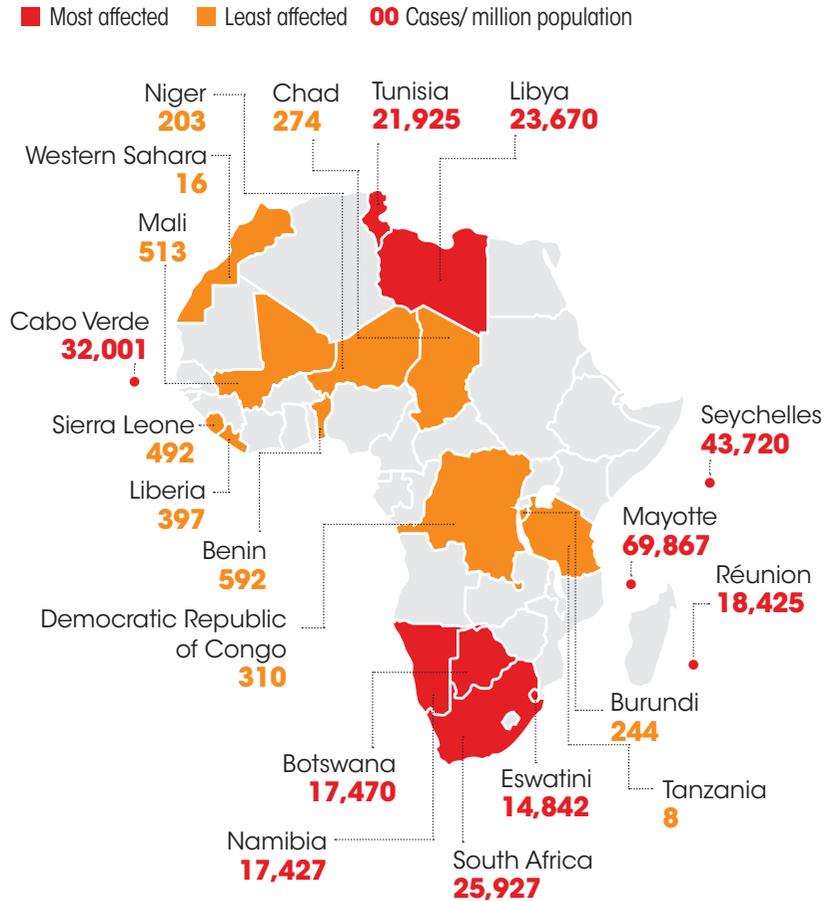
The increase in COVID-19 cases in recent months casts doubts on Africa's immunity to the virus. One reason could be the presence of new variants. "We are dealing with a new virus and while we have learned a lot in the last one year, there is still so much to understand about the disease pattern. We are detecting cases with the variant of concern B.1.1.7 [the UK variant] that is associated with increased transmissibility," Chikwe Ihekweazu, Director General, Nigeria Centre for Disease Control, told DTE.

The continent is currently being swept over by the South Africa variant and the UK variant. The South Africa variant has spread to 18 countries, mostly in the southern part of the continent, while the UK variant has been detected in 16. Eight countries, including South Africa, have reported both the variants. A *Lancet* study published on March 30, 2021, says the pandemic situation in all 55 African Union member states have not been comprehensively reviewed till date. "Although the first wave of the COVID-19 pandemic progressed more slowly in Africa than the rest of the world, by December 2020, the second wave appeared to be much more aggressive with many more cases," states the study, titled "The first and second waves of the COVID-19 pandemic in Africa: a cross-sectional study."

Relaxation of preventive measures, such as social distancing, to overcome the economic crisis spurred by lockdowns could be another reason behind the surge. After the first wave, the continent saw proactive government actions to curb the spread. Health ministers from across Africa came together to develop a unified strategy. The plan focused on three pillars: preventing

Two extremes

Some of the smallest countries of Africa, such as Seychelles and Mayotte, are also its most affected from the pandemic



Source: Worldometers

COVID-19 transmissions, averting deaths, and avoiding social and economic harm.

By April 15, 2020, a total of 48 countries of the WHO African Region had imposed five or more stringent public health and social measures (PHSM). An 18-country survey by Partnership for Evidence-based Response (PERC), a public-private partnership that supports evidence-based measures to reduce the impact of COVID-19 on African Union Member States, conducted between August 4 and 17, found high support for PHSM. But by December 31, 2020, just 36 countries had five or more stringent PHSM in place, says an Africa-wide analysis based on the Oxford COVID-19 Government Response Tracker. As



on March 22, 2021, the countries have lenient COVID-19 restrictions, says the tracker.

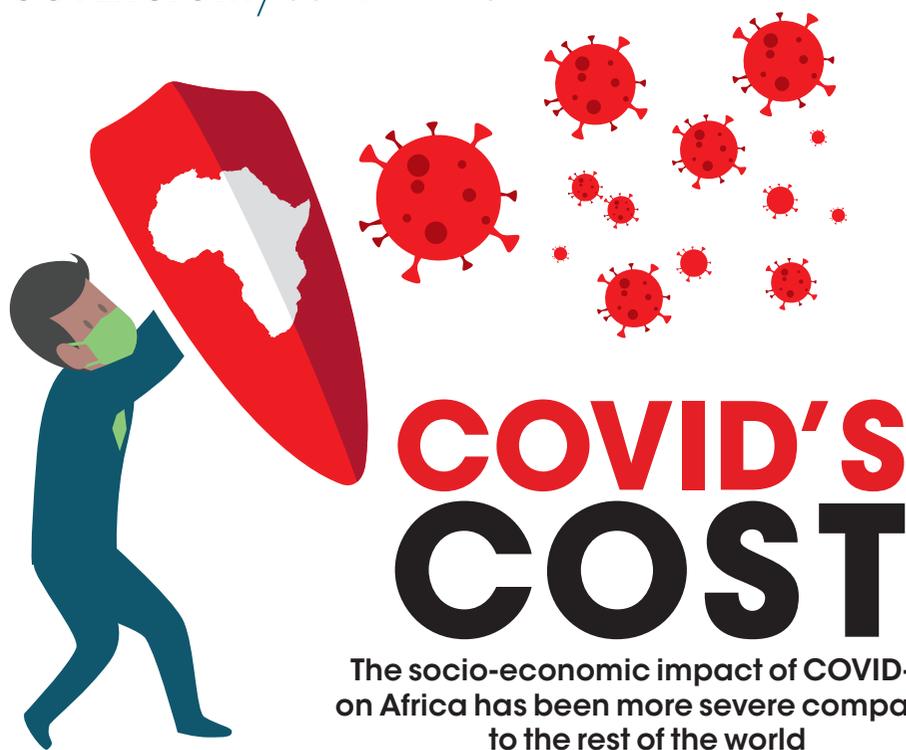
In fact, countries had started easing restrictions by mid-2020 itself, mostly to get the economy on track. Take the case of Kenya, one of Africa's worst affected countries. In Kenya, the positivity rate (percentage of positive cases among those tested for the infection), on average, remained high, hovering at around 13 per cent during the cold months of May and June. This was before the president Uhuru Kenyatta lifted the movement blockade in and out of Nairobi on July 6. The

^
 Travellers wait to get tested at the Grasmere Toll Plaza, in Lenasia, South Africa, on January 14, 2021

easing was also accompanied by relaxation on closure of places of worship, allowing small number of worshippers to congregate at a time.

Despite the let-up in the control rules on gatherings and movement, infections continued to fall, dipping to a positivity rate of 4 per cent in September, due to, experts speculate, the end of the cold season that lasted until August. The encouraging trend continued throughout the month, prompting the president to review containment measures further on September 28, 2020.

Three weeks later infections began to climb, reaching a positivity rate of 16 per



COVID'S COST

The socio-economic impact of COVID-19 on Africa has been more severe compared to the rest of the world

Poor health infrastructure*

Even by April 2020, the region's health infrastructure was ill-prepared for a pandemic

2.1

Physicians (per 10,000 people), 2010-17

World average 14.9



10

Nurses and midwives (per 10,000 people), 2010-18

World average 34



8

Hospital beds (per 10,000 people), 2010-18

World average 28



5.3%

Current health expenditure (% of GDP), 2016

World average 9.8%



*In Sub-Saharan Africa

Employment loss

Population without any social protection and labour programme*

90%

This was 79.4% in 2007-16



% working hours lost relative to Q4/2019 in 2020

7.7
Africa

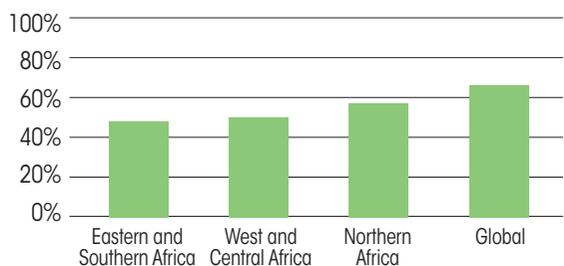
8.8
World



Learning interrupted

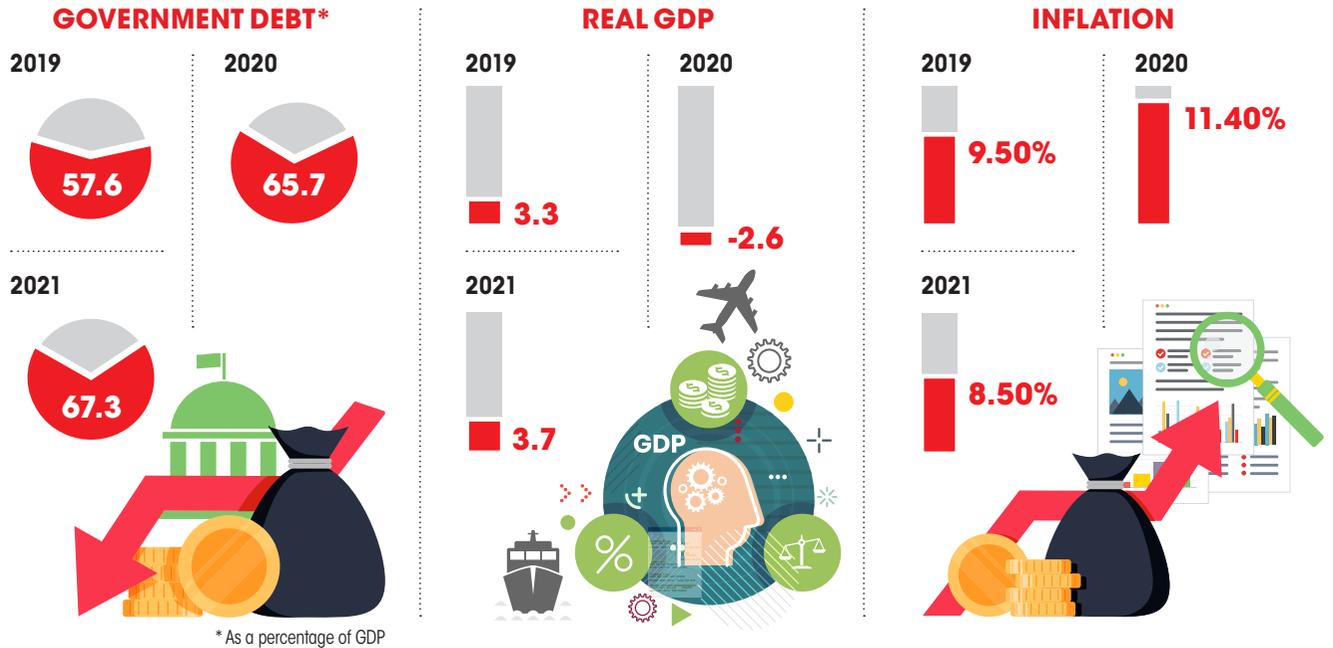
Percentage and number of students potentially reached and not reached† by digital and broadcast remote learning policies, by region (pre-primary to upper secondary)

■ Potentially reached



Downward indicators

Compared to 2019, Africa's economic indicators saw a major dip in the pandemic year and are likely to make a partial recovery in 2021



Wayward trajectory

COVID-19 has diverted Africa from nearly all of its Sustainable Development Goals



GOAL 1: No Poverty

— 23 million people or more could be pushed into extreme poverty more could be



GOAL 4: Quality Education

— 288 million learners are out of school due to closures



GOAL 7: Affordable, clean energy

+ Reduced demand led to fall in energy cost, which increases access
— Reduces incentives for renewables



GOAL 10: Reduced Inequality

— Disproportionate negative effects on the most poor will exacerbate inequality



GOAL 13: Climate Action

+ Decrease in GHG emissions
— Climate commitments threatened by recession



GOAL 16: Peace, Justice and Strong Institutions

— Disruption to free press, heightened risk of conflict



GOAL 2: Zero Hunger

— 73 million Africans are forecast to be food insecure



GOAL 5: Gender Equality

— Increased violence against women and girls
— Decline in women incomes



GOAL 8: Decent Work and Economic Growth

— Economic recession, risk of massive unemployment



GOAL 11: Sustainable Cities and Communities

+ Reduced air pollution
— Increase in urban poverty



GOAL 14: Life Below Water

+ Reduced fishing
— Increase in single-use plastic waste



GOAL 17: Partnerships to achieve the Goals

+/- Increased global partnership commitments but still short of requisite levels
— Long-term risk of reduced official development assistance and other resources



GOAL 3: Good Health and Well-being

— Shortages exacerbating already weak health systems



GOAL 6: Water, Sanitation

— Inadequate services hinder people's from basic prevention measures against the virus



GOAL 9: Industry, Innovation and Infrastructure

+ Collaboration in scientific innovation
— Decline in industrial output



GOAL 12: Responsible Consumption and Production

+ Responsible consumption
— Increase in single-use plastics



GOAL 15: Life on Land

+ Reduced pressure on the environment due to decline in consumption



▲
A consignment of AstraZeneca/Oxford vaccines for distribution at the Kitengela cold rooms stores outside Nairobi, Kenya, on March 4, 2021

cent in October and a high of 20 per cent in November, as captured by *coronatracker.com*, a community-based project powered by over 460 volunteers from across the globe. Kenya had recorded a low of 53 new infections on September 28, for example, before witnessing an upsurge that peaked with 1,494 new cases at the end of October, according to figures posted by the tracker. October turned out to be one of the worst months for Kenya, when more than 15,000 new infections were recorded, straining hospitals across the country. Nearly 300 deaths were also witnessed according to the

country's health ministry. In September COVID-19 bed occupancy had gone down by 60 per cent, but 38 days later, it was up by 140 per cent.

The infections, according to Ngoy Nsenga, WHO-Africa COVID-19 Incident Manager, were not comparable to the second and the deadly wave sweeping through Europe at the time. "The fundamentals surrounding the virus in Africa remain the same as before negating the likelihood of a fresh wave. In addition, dynamics of the pandemics are also different when Africa is compared to Europe," Nsenga adds. The

virus, according to the official, had remained unchanged with no mutations at the time, Nsenga told DTE in an interview. The change in numbers had been caused by eased interventions in September, leading to people ditching disregarding containment precautions, Nsenga said.

Following the scare, Kenya tightened some of the restrictions it had relaxed in September, reducing operating hours for bars and eateries, and adding an extra hour to curfew duration. An huge fine of up to US \$200 was also imposed for those failing to wear a mask in public places. As a result infections began to slow, dropping from a high of 18 per cent in early November to around 10 per cent at the beginning of December 2020.

The figure dropped further to 6-8 per cent through December before stabilising at below 5 per cent in January 2021, as schools reopened after nearly ten months. By February, the positivity rate stabilised at below 3 per cent, according to the country's health minister Mutahi Kagwe.

On March 25, WHO declared a downward trend of the pandemic in Africa. It reported that 43 countries had flattened their epidemiological curve; but 11 countries had recorded rising cases in the weeks preceding March 25. WHO also had a disclaimer. "During the past four weeks (before March 25) deaths in Africa have dropped by 45 per cent compared with the previous four weeks, but the case fatality rate for cumulative deaths for the continent is 2.7 per cent which is still higher than the global cumulative case fatality rate of 2.2 per cent."

The resurgence of cases is ominous for the continent, both medically and economically. Preliminary reports from 21 countries, released by WHO's Regional Office for Africa on February 11, show that 66 per cent have inadequate critical care capacity; 24 per cent face burnout among health workers and 15 countries reported that oxygen production, crucial for severely ill COVID-19 patients, remains insufficient.

The pandemic has already pushed Africa into its first recession in 25 years. In 2020, GDP per capita is expected to contract by 2.6 per cent in Sub-Saharan Africa (see 'COVID's cost' on p38), and by the end of 2021, it is likely to have regressed to its 2008 level. As a consequence, COVID-19 could push as many as 34 million people into extreme poverty in Africa, erasing at least five years of progress in fighting poverty. *Dignity Not Destitution*, a report released by international non-profit Oxfam on April 9, 2020, predicts that the pandemic's economic impact could set back Africa's fight against poverty in some areas by 30 years.

ALL DEPENDS ON VACCINES

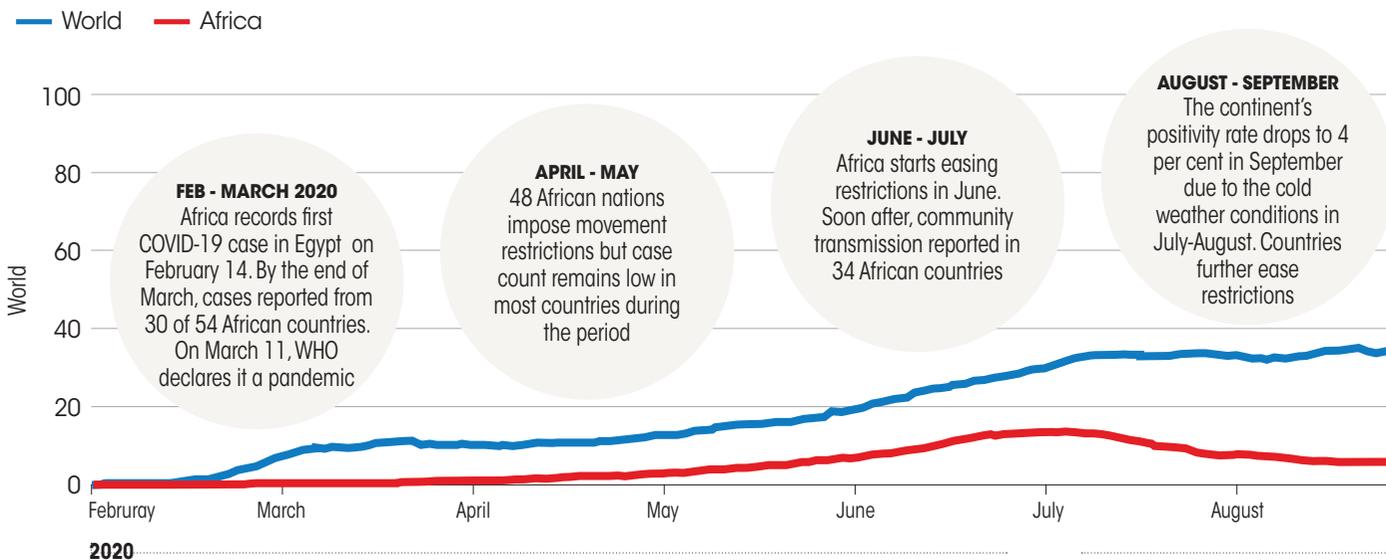
Countries are now putting all hopes on fast vaccination drives—faster than any other vaccine drive in the continent—to cover its 1 billion population and achieve herd immunity. This is easier said than done. "We may yet have another surge, especially if the vaccines do not arrive on time or the uptake is low," virologist Tomori Oyewole of Nigeria told DTE.

With vaccination on overdrive in Europe, America and Asia, Africa will soon have the highest unvaccinated population. "Anyone in the developed world who thinks they are unaffected by large swaths of unvaccinated



Unwanted peaks

COVID-19 cases in Africa rose gradually during the first peak in July 2020, but the second wave around January 2021, after new variants were found, was quite sudden



people in Africa, needs to think again," Phionah Atuhebwe, the New Vaccines Introduction Medical Officer on the continent for WHO, told *Bloomberg* on March 8, 2021. "As long as the pandemic continues to rage among unvaccinated populations, spawning new, more virulent, vaccine-resistant strains, no one is safe," she said. "The virus will definitely mutate and will keep mutating; the longer we keep the virus around the more mutations we'll see." Atuhebwe added, "If Africa is not vaccinated and we are a source of mutations, we put the

whole world at risk."

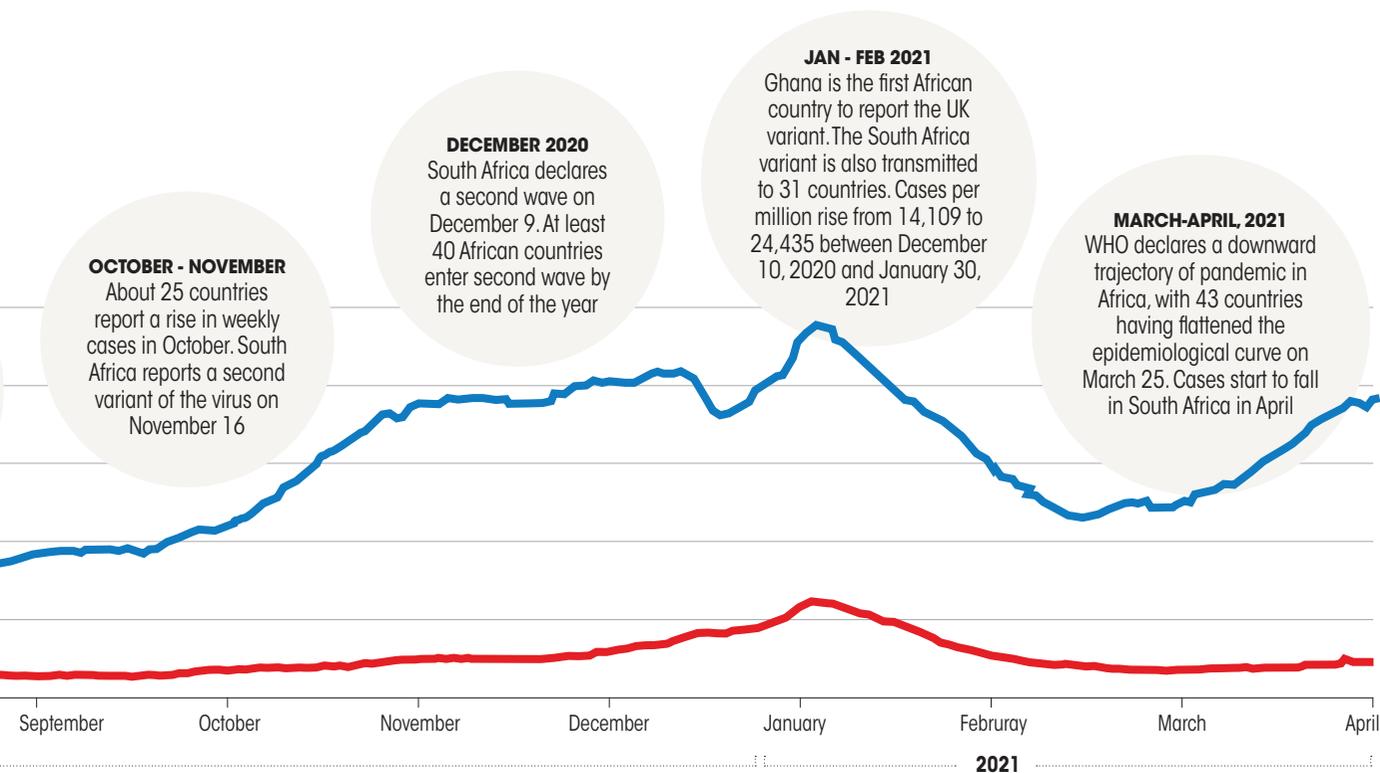
For Africa to vaccinate quickly, there should be enough dosages; the supply chain must be smooth enough to cater to the vast population; and the resources needed to implement this must be made available. All these three critical requirements are also the continent's toughest challenge.

By March 25, 2021, WHO said that some 44 countries had received vaccines mostly as donation, through bilateral agreements and via the COVAX Facility, a global initiative aimed at equitable access to COVID-19



"Rich nations accounting for 16 per cent of the world's population have bought 60 per cent of the global vaccine supply. Many of these countries aim to vaccinate 70 per cent of their adult population by midyear in pursuit of herd immunity"

TEDROS ADHANOM GHEBREYESUS
DIRECTOR GENERAL, WHO



Source: Our World in Data, news reports

vaccines. Currently, 32 countries have targeted vaccination programmes for high-risk population groups. Soon, this has to be expanded to a universal scale. Besides 10 countries are yet to get supply even for targeted population groups.

The COVAX Facility has a target to immunise 20 per cent of the continent's population by the end of 2021 (see 'The pain of getting the jab' on p46). It means some 80 per cent of the population will remain unvaccinated, and many of them will be from the high-risk population groups. So the herd immunity objective is simply not attainable in near future. As Matshidiso Moeti, WHO Regional Director for Africa, said on March 21, 2021, "A slowdown in vaccine supply could prolong the painful journey to end this pandemic for millions of people in Africa."

One can feel the desperation in the continent's worst affected country, South Africa. It continues to record the highest number of deaths, according to the most recent WHO updates. Since its first case in March 2020, the country has had nearly 52,000 COVID-19 deaths, as per government

data. And even this number is likely to be an underestimation. South Africa's "excess deaths" recorded since May 2020 stand at nearly 147,000. The South African Medical Research Council (SAMRC) regularly publishes a report, providing information on both natural (diseases and other medical conditions), and unnatural deaths (injuries) registered on the national population register. These are used to estimate the actual number of deaths that have occurred in the country and calculate the number of excess deaths over and above the numbers that would be expected had the historical mortality trends prior to the COVID-19 pandemic continued. Excess death, therefore, could indicate deaths associated with COVID-19. The timing and geographic pattern leave no room to question whether these are associated with the COVID-19 pandemic, Debbie Bradshaw, Chief Specialist Scientist at SAMRC, told DTE. "Unfortunately, it will be years before we have the information about the medical cause of death and so we cannot distinguish between deaths directly associated with



“We do not yet know the quality or length of protection the vaccines will provide and how effectively they will stop viral transmission. Numerous new variants threaten vaccine efficacy”

SALIM ABDOOL KARIM

CO-CHAIR OF THE MINISTERIAL ADVISORY COMMITTEE ON COVID-19 IN SOUTH AFRICA

COVID-19 and those that may have resulted due to the health system being overburdened,” Bradshaw adds.

On March 24, 2021, the South African Medical Research Council warned about the third wave of COVID-19 in the next few weeks. Hence, South Africa plans to vaccinate at least 40 million people (around 67 per cent of its population). Vaccination of healthcare workers has started. The country is part of the Covax Facility and would receive 20 million doses, possibly including the Pfizer vaccine, say media reports. It is also negotiating to buy the Sputnik and Sinopharm vaccines, said country’s health minister, Zweli Mkhize, on April 3, 2021.

INOCULATION TROUBLES

Africa’s vaccination drive has two major roadblocks: first is its own lack of capacity to manufacture vaccine and the second is getting enough from the rest of the world at a time when vaccine predation is the norm. The continent has just 10 vaccine manufacturers in five countries: Egypt, Morocco, Senegal, South Africa and Tunisia. “Rich nations accounting for 16 per cent of the world’s population have bought 60 per cent of the global vaccine supply. Many of these countries aim to vaccinate 70 per cent of their adult population by midyear in pursuit of herd immunity,” wrote WHO Director General Tedros Adhanom Ghebreyesus in *Foreign Policy* on February 2, 2021.

Of its 1.3 billion people, Africa could vaccinate just half a million in March. Compare it with India, which has a similar

population but has vaccinated more than 60 million. Salim Abdool Karim, co-chair of the Ministerial Advisory Committee on COVID-19 in South Africa, told DTE that all countries should vaccinate equally and suppress the pandemic together on a global level. Supply chain constraints, pricing and unequal vaccine procurement across countries mean that coverage across most, if not all, countries will remain below the level required for herd immunity. “Fundamentally, there’s a mistaken belief by some countries that they can vaccinate their populations and they’ll be safe. It simply is not true. In this world that we live in, with this coronavirus, no-one is safe until everyone is safe,” Karim said.

Ngozi Erondú, Infectious Disease Epidemiologist and Senior Scholar, O’Neill Institute, Georgetown University, US, says the issue for the Africa is timely access to vaccines. “Due to the hoarding of vaccines by rich countries and the unfair distribution models from Western pharmaceutical companies, people in most countries in Africa (and other low- and middle-income countries) may not receive vaccines until 2022 or even 2023. This is even with the Covax initiative in place.” She adds: “Indeed vaccine nationalism is a major obstacle to equitable distribution of vaccines. However, while some countries have bought up most of the available vaccines, others left scrambling have themselves to blame. The proactive countries took a gamble and paid for vaccines that were still at the developmental level,” Tomori says.



Sorry!!!'
No Carry



Chhattisgarh Environment Conservation Board
'Paryavas Bhavan', Sector-19, New Raipur(C.G.)



The pain of getting the jab

The COVAX Facility and the African Union are struggling to bring some relief to Africa which has been suffering from vaccine apartheid

LATHA JISHNU

NOT HEADS of state or even popular celebrities have received the kind of reception that vaccine shipments are getting in Africa as it struggles against a resurgence of the COVID-19 pandemic. As the first tranche of the vaccines against the SARS-COV-2 virus arrives in select nations, heads of government and senior cabinet ministers have turned up to receive the precious vials, acknowledging their critical importance to a region that has suffered from COVID-19 nationalism—the tendency of developed countries to retain and corner

supplies of therapies, equipment and vaccines for their own citizens while depriving needy populations elsewhere.

On February 1, 2021, as an Emirates flight landed at Johannesburg's OR Tambo airport carrying AstraZeneca's vaccine, the South Africa Broadcasting Corp was on hand to film the momentous event from the time the plane touched down in pouring rain at 3 pm. It was the first lot of vaccines to arrive in the continent and President Cyril Ramaphosa and top officials were present to receive the one million doses that

the South African government had bought from the Serum Institute of India (SII), the major licensed manufacturer of the AstraZeneca vaccine.

For South Africa (SA), burdened with heaviest caseload and fatalities in Africa, the SII consignment was critical to jumpstart the vaccination of its most vulnerable people, starting with frontline healthcare workers. It had paid a much higher price for the vaccines than the rate SII had charged rich nations because supplies were tight. However, Ramaphosa's relief in wangling the deal was short-lived. The vaccine was found to be ineffective against B.1.351, the dominant variant of the SARS-COV-2 virus that is ravaging the country and the government decided not to deploy it. Instead, it sold the consignment to the African Union in a controversial move that some public health experts slammed as ill-considered. "SA has squandered the opportunity to protect at least half a million of its most vulnerable citizens before the next resurgence, with massive healthcare and economic cost," they said in a recent article published in the *South African Medical Journal*.

The rollout has been extremely slow since then. According to the data put out by the Johns Hopkins University, less than 270,000 health workers had been vaccinated in SA till April 4, accounting for 0.5 per cent of the population. These vaccinations were made possible through the one million doses which SA, an upper middle income country, was able to secure from Johnson & Johnson (J&J). The single-jab J&J vaccine is the latest to hit the market and has been quickly approved by the World Health Organization (WHO) for emergency use, making it just the fourth to get emergency use authorisation. There is already a scramble for supplies.

Overall, the situation is dire, says the People's Vaccine Alliance, a coalition of global campaigners for justice and equity. One year on from the declaration of the COVID-19 pandemic, developing countries are not only facing critical shortages of oxygen and medical supplies to cope with the fresh surge in COVID-19 cases but many are unable

With more than 39 million vaccine doses administered in at least 49 higher-income countries, while around 130 countries had seen no vaccines at all, the promise of equitable access to vaccines has been receding fast

to administer even a single dose of the vaccine against the deadly disease. "In contrast rich nations have vaccinated their citizens at a rate of one person per second over the last month," says Oxfam, which is the lead voice for the campaign.

In December, it had warned that nine of 10 people in poor countries would miss out on COVID-19 vaccine in 2021 because wealthy nations had bought up enough supplies to vaccinate their populations three times over. The alliance calculated that 67 low- and lower middle-income countries, 42 of them in Africa, risk being left behind since rich nations representing just 14 per cent of the world's population had bought up 53 per cent of all the most promising vaccines.

The pay and grab attitude of the developed world also provoked a passionate outburst from WHO chief Tedros Adhanom Ghebreyesus, who warned that: "The world is on the brink of a catastrophic moral failure—and the price of this failure will be paid with lives and livelihoods in the world's poorest countries." With more than 39 million vaccine doses administered in at least 49 higher-income countries, while around 130 countries had seen no vaccines at all, the promise of equitable access to vaccines has been receding fast.

Africa has long suffered health apartheid. Recall the HIV/AIDS pandemic of 25 years ago which underscored the stark inequalities in access to critical medicines—there is still no vaccine for the disease—that allowed millions to die in Africa. The medicines that were developed went only to the rich and it was only after a decade, thanks primarily to an Indian generics company's determination to break the monopoly of rapacious drug multinationals, that people in Africa and elsewhere could access the life-saving medicines. There is the more recent history of the 2009 swine flu pandemic, albeit of a less serious nature. Then, too, rich countries had cornered the vaccines through advance orders, while poor nations were forced to wait. By the time they got access to supplies, the pandemic was over. Some would argue that vaccine equity can no longer brushed

aside since a pandemic of this nature has made it clear that no one is safe until everyone is safe. Vaccine nationalism, as the crusading WHO director-general has been emphasising at every opportunity, harms everyone and protects no one.

There is also one significant innovation: the COVAX Facility set up last year. Steered by GAVI, the vaccine alliance, and WHO along with Coalition for Epidemic Preparedness Innovations, a charity based in Norway, and UNICEF, it promotes itself as “a global risk-sharing mechanism for pooled procurement and equitable distribution of COVID-19 vaccines”. COVAX buys vaccines through an advance market commitment mechanism and distributes them on two levels: one for fully self-financing countries and the second for donor dependent countries.

The COVAX Facility has its limitations and is struggling to secure supplies against the aggressive purchases made by countries like the UK, Canada, Australia and the US which have enough doses to cover as much as 453 to 182 per cent of their populations.

As the first ever COVAX shipment arrived in Ghana towards the end of February and spread to 14 other African countries in subsequent weeks, the COVAX Facility was providing a lifeline to Africa and to the hope that the continent would be able to turn the tide against the new wave of the pandemic. That is, until SII threw a whammy. It informed COVAX that its scheduled supplies for March and April would be on hold till the Indian government permitted it. The export hold-up—India itself is in throes of an alarming new outbreak of COVID-19—will throw out of kilter the vaccination schedules of dozens of countries. SII was to supply 40 million doses in March and up to 50 million doses in April and if the delay is extended, the consequences would be “catastrophic”, John Nkengasong, director of the Africa Centres for Disease Control and Prevention said bluntly at a press briefing in Addis Ababa.

With SII accounting for as much as 86 per cent of COVAX procurement, it underlines the fragility of the mechanism.

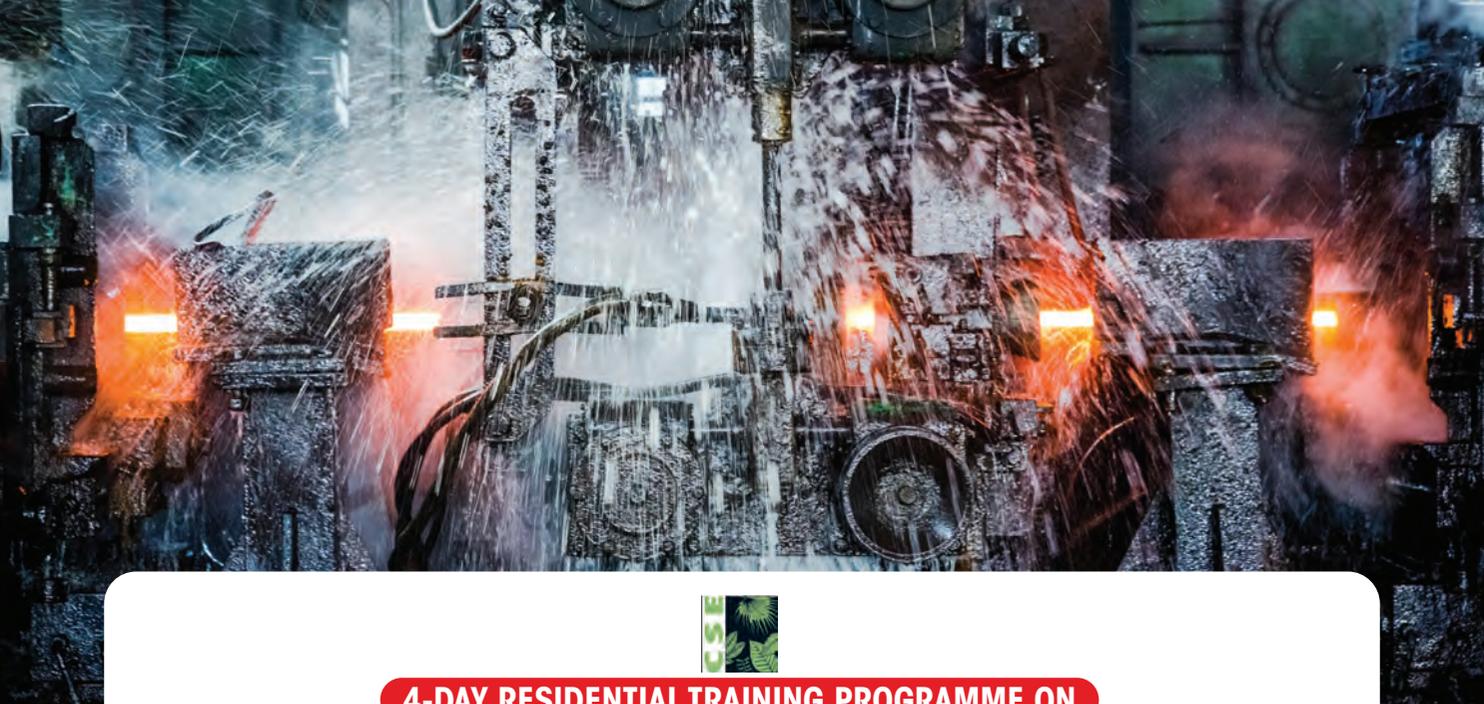
African has three options to access COVID-19 vaccines: the COVAX Facility, the African Union's vaccine pool or to secure them through bilateral agreements with either countries or companies. The last is clearly a difficult exercise

It is likely that the African Union's carefully worked out strategy to vaccinate 30-35 per cent of the continent's population by the end of 2021 will go for a toss even if it has managed to secure 220 million doses of the J&J vaccine beginning in the third quarter of this year. It is hopeful of tying up another 180 million doses from the company, but already other countries are circling the company in search of additional supplies. J&J's vaccine is just one of four approved by WHO for emergency use, the others being the AstraZeneca vaccine manufactured by SII and South Korea's SK Bioscience. The first to get the nod was the Pfizer-BioNTech vaccine which comes with onerous storage requirements and is not suitable for Africa and other poor countries.

Rich countries are likely to deepen the vaccine divide in coming days since some of them, like the UK, are planning to give booster shots to health workers and to people over 70 to provide additional immunity against variants of the SARS-COV-2 virus. Others, meanwhile, are proposing to vaccinate children, all of which will leave very few doses to be mopped up by COVAX.

African governments have three options to access COVID-19 vaccines: the COVAX Facility, the African Union's vaccine pool or to secure them through bilateral agreements with either countries or companies. The last is clearly a difficult exercise. The competition for limited supplies is cut-throat since developed nations are aiming to vaccinate 70 per cent of their adult population by the middle of this year to achieve herd immunity. Such a prospect is unlikely African countries for quite a while. As COVAX made it clear when the 600,000 vaccine doses landed in Accra, its aim of vaccinating 20 per cent of its members by the end of 2021 would be jeopardised unless governments refrain from additional bilateral deals that take further supplies out of the market.

For Africa, there are unique problems to contend with. One is the underestimation of COVID cases which has fed into the convenient narrative that African countries do not need vaccines as urgently as other nations.



4-DAY RESIDENTIAL TRAINING PROGRAMME ON

“REDUCING WATER FOOTPRINT IN INDUSTRIES THROUGH WATER AUDIT & WASTEWATER MANAGEMENT”

COURSE DATE: 4th-7th May, 2021

COURSE TIME: 09:30 am to 05:30 pm

LAST DATE TO APPLY: 25th April, 2021

COURSE VENUE – Anil Agarwal Environmental Training Institute (AAETI), Tijara, Rajasthan about 100 km from Delhi. Participants have to reach to New Delhi at their own expenses on 3rd May, 2021. CSE will arrange transportation of the participants between Delhi and AAETI on 3rd May and 8th May (return).

BACKGROUND

Increasing industrial production especially in water intensive industries (like thermal power plants, pulp & paper, textiles, fertilisers, etc.) is already putting pressure on the limited freshwater resources in India and worldwide. Sourcing water and managing wastewater is becoming increasingly difficult & expensive and hence is an important aspect for sustainability of any industry. Industries which are heavily dependent on water for their production have to cut down on their production at times due to scarcity of water mainly during summer season. Such scenarios have become more frequent in the past few

years due to reduced water availability and increasing water stress. Therefore, it is very critical that industries use water judiciously and reduce its water footprint as much as possible in order to be sustainable in future.

Water use optimisation, improving water accounting systems, identifying water losses and opportunities for water savings can serve as an effective approach for reducing water consumption. Also, efficient wastewater treatment technologies and recycling and reuse practices can further bring down consumption and effluent generation. Further, substantial costs which are associated with

water & wastewater management can be effectively reduced through better water and wastewater management and through periodic conduction of water audits.

Understanding the relevance of the subject, Centre for Science and Environment (CSE) a 4-day training programme at its training campus Anil Agarwal Environment Training Institute (AAETI), Alwar with the aim of providing a wider understanding on the above aspects of water audit, wastewater management and recycling in industries. Certificates will be provided upon completion of course.

KEY LEARNINGS FROM THE COURSE

- Water audit – Introduction, Scope and Methodology
- Preparing industry specific water audit questionnaire
- Water audit instrumentation, metering and accounting – practical aspects
- Preparing water circuit diagram and water balance with industry-specific case studies
- Water audit, wastewater recycling and reuse – Regulatory aspects
- Specific water consumption & benchmarking
- Understanding water utilities basics - pumps and cooling towers
- Advanced water & wastewater treatment technologies
- Industry specific case studies on opportunities identified for water savings through water audits;
- Water and wastewater costing and cost benefit analysis of water saving schemes
- Field visit to industry to understand water conservation practices
- Case studies/Assignments/Exercises

WHO CAN APPLY?

Industry professionals, EHS officials, environmental consultants, environment engineers, environment regulators, environmental laboratories and academic institutions

COURSE FEE

Rs 22,000/- per participant (Fees Includes training material, boarding and lodging, travel from New Delhi to AAETI, Alwar and back)

For further details and to register, please contact:

Sugandha Arora

Deputy Programme Manager

Industrial Sustainability Unit | Centre for Science & Environment

Email: sugandha.arora@cseindia.org

Mobile: +91-9953588873

In fact, the continent's much lower cases and mortality rates have worked against it. As such, theories that Africa's younger population is better placed to fight the disease have been picked up by Western nations and their media. For instance, in a recent piece lauding COVAX, *The Economist* used this argument to defend vaccine hoarding. "It is true that rich countries have vaccines in far greater supply than poor ones. But it is also true that rich and middle-income countries, with their older and fatter populations, have been much harder hit by COVID-19," it said.

The task ahead is daunting. According to one estimate, to achieve herd immunity Africa will need about 1.5 billion vaccine doses which will add up to an eye-popping \$8-16 billion apart from the costs of administering the vaccines. So where does it get this kind of funding? Is manufacturing of vaccines in the region an option?

The ground reality is not encouraging. Just five countries, Egypt, Morocco, Senegal, South Africa and Tunisia have vaccine manufacturing companies, most of them engaged primarily in packaging and labelling, while some do filling and finishing. Setting up pharmaceutical manufacturing is expensive and impractical for most of the region's poor countries.

Even if some countries come together to set up manufacturing hubs they will have to deal with another challenge. Most African countries are supplied vaccines by UNICEF; just a handful of countries are equipped to manage their own procurement. This has shaped the vaccine markets in Africa in such way that commercial enterprises would find it difficult to become sustainable without government support through advance purchases.

All the same, the Africa Centres for Disease Control and Prevention is pursuing a strategy to step up R&D in developing vaccines. It might appear to be a pipe dream to sceptical outsiders, but already there is some promising news. The African Vaccine Acquisition Trust, which is negotiating with



the J&J for supplies of 400 million COVID-19 vaccine doses, says SA's Aspen Pharmacare, the largest producer of generic medicines in the continent, will be producing 300 million doses. Of this, 10 per cent will be used domestically and the rest will be distributed across the continent.

There is something even more promising. Nigerian researchers had reported in June last year that they had come up with a vaccine for COVID-19. The team had been working on the genome of the SARS-COV-2 virus prevalent in Africa. Nothing was heard of the breakthrough till the first week of April when the head of the presidential task force on COVID-19 announced that clinical trials had begun on two vaccines.

Medical history may be in the making in Africa. Perhaps getting the jab to Africans may no longer be as painful as it is now. **DTE**

[@down2earthindia](#)



WASTE WARRIORS: Environmental Toolkit on Waste Management

Designed with the principle of a fun-filled learning experience, the set of innovative activities aims to serve children with all kinds of learning needs. The activities involve real-life situations that not just provide knowledge to children but also the relevant skills to apply it in their everyday lives. Each activity is accompanied with relevant information, facts and explanations to provide a holistic learning experience that does not just stop at fun.

This unique Activity Set includes a Board Game, Flashcards, and many more. Students and young learners can get started on sustainable lifestyles, beginning with being responsible Waste Managers !!!



Waste Management in Schools: A Manual for Schools to Become Waste-Wise

This much awaited manual on waste management has been designed for both teachers and students and is packed with information, activities and actions that students can undertake.

It has options to choose tools and get on the job to manage waste in schools.

It aims at encouraging schools to manage their waste responsibly and, more importantly, engage the students in the process, and trigger positive environmental action among them.

In fact a very good manual for anyone to understand more about this vital topic of waste management and implement it.

YOU CAN RESERVE YOUR COPY NOW !!!

Please place your order online by visiting us at <https://csestore.cse.org.in/>



scan the QR code here

or mail your order along with a Cheque for the required amount, drawn in favour of "Centre for Science and Environment", to



Centre for Science and Environment
41, Tughlakabad Institutional Area
New Delhi - 110062

In case of any query, write to Ramachandran at: rchandran@cseindia.org

Can vaccines become as cheap as generics?

A SERIES OF articles in unexpected publications has had a curious theme. They call on India to “walk the talk” on its demand at the World Trade Organization (WTO) to waive intellectual property rights (IPRS) on all COVID-19 therapies, equipment and vaccines till the pandemic is over. The writers, some of whom are domain experts, want the government to buy out the IPRS on the indigenously produced Covaxin vaccine from its developers, the privately owned Bharat Biotech and the public sector Indian Council of Medical Research that funded the project, and open up production of the vaccine to anyone wanting to manufacture it.

This, argue the proponents of the proposal, would prove India’s bona fides at WTO where the country, along with South Africa, has sought to keep the TRIPS agreement in abeyance for the duration of the pandemic. It has garnered the support of around 100 countries. While developed countries have outright rejected the proposal, a number of high-profile rights organisations, public health campaigners and others fighting for justice are championing the demand because they believe it will widen access to much-needed equipment, drugs and vaccines to fight the SARS-COV-2 virus.

The moot point is whether the waiver will, indeed, do so. In particular, can vaccines, the desperate need of the times, be made as low-cost and as widely as generic medicines? It would be like comparing apples with oranges. Yusuf Hamied, the man who fought the definitive battle on IPRS and changed forever the profile of the generic drug industry, sets right some popular misconceptions on what the lifting of IPRS can achieve with vaccines. Hamied, the chairman of Cipla,

the small generics which took on the drug multinationals by producing drugs at a fraction of the cost they charged to treat HIV-AIDS some 25 years ago, explains that vaccines are a different ball game altogether from the synthetic drugs used to treat the deadly HIV-AIDS disease, which are basically small molecules and easy to synthesise.

“You can pick up a patent of a vaccine manufacturer and you still won’t be able to produce it. It’s like biotech. Humira, the world’s top-selling biotech drug is surrounded by 247 patents. I free the patents, but what are you going to do with that?” Hamied says, using the example of Humira, which is a biologic or a medication made from living cells just as most traditional vaccines are.

Unlike with drugs, freeing up patents will not make it any easier to manufacture vaccines for COVID-19, says Cipla’s Hamied

Given the pressure that the COVID-19 pandemic has put on vaccine makers and governments, there is a general belief that when

generic medicines are produced so much more cheaply than the innovator drugs, second-generation vaccines, too, can be made much more cheaply than the original vaccine if patents did not act as a barrier. This is not the right comparison because in the case of vaccines, there are no “generics” per se. The regulatory process for second-generation or follow-on products is exactly the same as for the original vaccine. This means that unlike generic drug makers, second-generation vaccine manufacturers have to develop their own production processes and show efficacy and safety through fresh clinical trials; showing bio-equivalence is simply not enough.

Has Hamied said the last word on the issue, or will there be further debate? **DTE**

 @ljishnu

Palette

WHAT'S INSIDE

Excerpts from *Oonga*, a story about a Dongria Kondh boy caught in an ecological conflict **P54**

Water-related MGNREGA interventions must be suited to geographical requirements **P56**

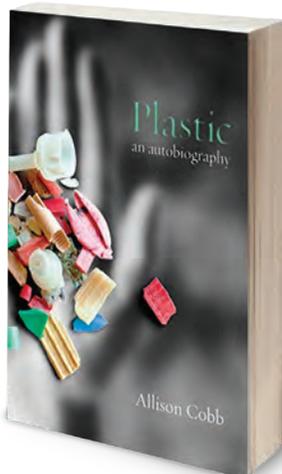
RECOMMENDATIONS

DOCUSERIES

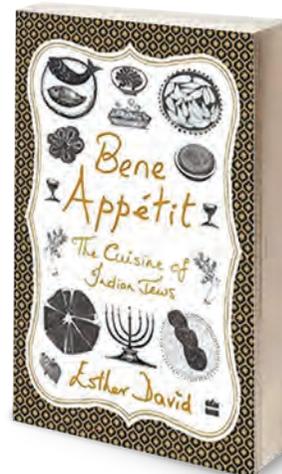


Humankind has never been able to fully appreciate the world through the eyes of animals, who can perceive a much wider range of colours than us. New Netflix docuseries *Life in Colour with David Attenborough* attempts to bridge that gap and show us the natural world like we have never experienced before. Narrated by the proclaimed television personality and broadcaster, each of the three episodes of the series uses specially made technology to show us how a spider, a frog or even a mantis shrimp sees its surroundings. *Life in Colour with David Attenborough* will premiere on Earth Day, April 22, on Netflix.

BOOKS



Plastic: An Autobiography starts as an obsession to learn the origin of a large plastic car part. Soon, it turns into a complex narrative on the relationships among plastic waste, climate change, nuclear technology and the consume-and-dispose culture. In the book, American writer Allison Cobb untangles this web through a series of interwoven stories originating from ancient Phoenicia in West Asia to Alabama and her own childhood home of Los Alamos, New Mexico in the US.



The Jewish community in India is small and fragmented, but has strived to stay true to its native and adopted roots through its cuisine. Through *Bene Appétit: The Cuisine of Indian Jews*, Indian-born Jewish writer and artist Esther David traces the dietary habits of the Bene Israelis of western India, the Bene Menashes of the Northeast, the Bene Ephraims of Andhra Pradesh, the Baghdadi Jews of Kolkata and the Kochi Jews, that adhere to Jewish rules while adopting the regional cuisine.

'The story tries to explore many themes'

Oonga was a product of experience, not research, **DEVASHISH MAKHIJA** tells **ADITYA MISRA**

What prompted you to turn *Oonga* into a book seven years after you made a film on the subject?

The same reasons that prompt someone to turn a book into a movie—it opens up the story to a different audience and to different ways of experiencing the journey. This particular story has tried to explore so many themes, questions, ideas and characters that a 90-minute film could not comprehensively accommodate, but a book finally could.



Did you undertake any new research for the book or was it completely based on the work done for the film?

Stories like *Oonga* are not a product of "research" but "experience". When I travelled to the regions that the narrative is set in, I did not have a story in mind. All the things one sees, experiences, assimilates, understands, has epiphanies about, or gets moved by, proceed to slowly amalgamate into something—an article, if one is a journalist; a paper, if one is an academic; a documentary, if one is a

Why did you choose to highlight the struggles of the Dongria Kondh community in Niyamgiri, Odisha, for the film and now the book?

The Dongria Kondh tribal people and Odisha merely serve as a means to root the story in some geo-cultural context. But I have tried to not relegate the story of *Oonga* to Niyamgiri alone. All such struggles/protests/fights for fairness and justice across the world have many commonalities. I've tried to tell an allegorical tale that hopefully anyone across the world would be able to connect a little with their own battles.

documentary filmmaker; poems, if one is a poet; or a story, if one is a storyteller. I simply undertook a journey many years ago, that continues as this book. I have also made a short film around the same situation and material called *Cycle* that should start its film festival journey sometime soon. I have written another feature film around this too. [Movie actor] Manoj Bajpayee and I have been trying to find producers for it for a couple of years now. In effect, my research continues even beyond the publication of this book.

leaves celebrate his victory. Rama's victory.

His eyes are blurry. He is on his back, looking up. He sees a dawn sky. And the insides of trees. And long trails of smoke rising up. And then he sees his Amma. She looks down at him from above, and smiles in relief. "Oonga," she whispers, and cradles his face in her bruised hands. In Oongamma's eyes is an abyss of sorrow. But Oonga cannot see it. His head has been bandaged with a torn piece of her saree.

"Amma?" Oonga grins. "Rama won."

Oongamma, unsure what she should say, nods, then pats his head, and pushes herself up from his side, tired of the tears that keep coming even though she's

emptied her reservoir of pain many times over since last night. Her stomach is in terrific pain. For the first time ever the little one inside her kicks. Oongamma can't tell if she kicks because she wants to be let out? Or because she's angry and wants no part of this world they are to bequeath her.

A wizened old hand appears on Oonga's shoulder. Oonga turns to see Kunja fix a bracelet on his little arm. Oonga's eyes sparkle! But he's suspicious, "You said I get this only when I become a man?"

Kunja nods, unable to say much else. Oonga beams as the bracelet sits tight on his faded blue arm.

Kunja stands up, steps aside, as two boys in green uniform appear and lift Oonga's makeshift stretcher off the ground. As Oonga

floats away from Kunja, the bracelet gleams, sending a thrill rippling through Oonga's battered blue body.

He is a man. He is a king. He is a god. He is victorious. He avenged his Hemla didi. He saved his village. He killed Ravana. He is Rama. He is all the things no one else can ever be.

That glorious realisation is too much excitement for Oonga's tired little mind, and he passes out again, just as the boy carrying his stretcher trips on a small body in his path. He turns to go round the little corpse, not noticing the brown muddy swathes on either cheek of her slightly charred face. **DTI**

 @down2earthindia

(Published with permission from Tulika Publishers)

NOT JUST ANYWHERE

Water structures built under rural employment guarantee scheme must be suited to local geography

M DINESH KUMAR

THE UNION government has spent some ₹3,83,320 crore in the last seven years (2014-2020) under the Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA) to enhance livelihood security in rural areas by providing at least 100 days of guaranteed wage employment in a year. Almost 40 per cent of the funds spent on physical works is focused on water management, which includes creating water storage structures and irrigation sources, implementing watershed works, desilting village tanks, ponds and irrigation canals, levelling of land as well as afforestation. The rationale behind this deliberate push for such interventions, which are planned and executed at the level of gram panchayats, is to improve water security in rural areas. Yet after 15 years since the implementation of MGNREGA, the actual outcome of the scheme remains unsatisfactory.

Today, many water management structures built under MGNREGA across the country lie defunct. A prime reason for this failure is that a majority of them are poorly constructed due to the absence of sound technical specifications for planning and design of the schemes and of proper expert supervision of the works. The other major short-coming is the inadequate attention being paid to the topography, hydrology, geohydrology and the climate of localities where such interventions are planned.

Consider this. Many often recharge structures are built without due consideration to the storage properties of underlying formations, and then the structures end up functioning as evaporation ponds. The unavailability of data at the local level related to the catchment drainage characteristics,

volume of runoff that can be harnessed without impacting areas downstream, and the storage or yield characteristics of the aquifers, adds to the challenge. Even when such data are available, the implementing agencies hardly have the necessary technical expertise to analyse and act on them. The result is oversized schemes, silting and overcrowding of catchments with structures, leading to limited hydrological and economic benefits. For example, several ponds have been created in the catchments of hot, arid regions with extremely limited runoff, drying up streams and traditional waterbodies.

These pitfalls can be avoided if we keep in mind a few basics about the agro-climate, hydrology and geology of different regions, while determining which land and water-based interventions to implement.





stop soil erosion and silting up of reservoirs. Forest cover improves the hydrological regime by reducing the peak runoff rates and increasing evaporation from the shallow groundwater, thereby increasing flood cushioning.

Next are naturally water-abundant but physically water-scarce areas in the western and eastern Himalayan regions; the west coast plains; and the hills of Maharashtra, Karnataka and Kerala. Works related to runoff water harvesting and provision of irrigation facilities for economically weaker classes are best suited for such regions. They are also perfect for surface water harvesting or creating impoundments. Soil and water management interventions like contour bunding, drainage control and gully plugging are effective in these regions. Small on-farm storage structures can also be constructed in these hilly areas to provide irrigation facilities.

Finally, we have naturally and physically water-scarce areas in Punjab, Haryana and Rajasthan; the central, western and southern plateau region; the Gujarat plains and the western dry regions. The renovation of traditional water bodies and on-farm water management can help in such areas that experience physical water scarcity, owing to water demands that far exceed the renewable capacity in the region. They also have highly variable monsoon rainfall and high evaporation rates. The management of water demand for agriculture is extremely important for mitigating water scarcity in these regions. Keeping this in mind, investments should be on land-levelling for on-farm water management, de-silting and lining of canals and renovation of traditional waterbodies.

This means MGNREGA can create sustainable assets through careful regional planning and efficient implementation of water management works. It is imperative that when public funds are spent on creating assets in a decentralised manner in villages, a small fraction is spent on providing proper scientific and technical inputs for planning and execution. **DTE**

 @down2earthindia

(M Dinesh Kumar is executive director, Institute for Resource Analysis and Policy, Hyderabad)

A BRUSH-UP COURSE

To begin with, the country can be divided into three broad typologies based on agro-climatic, hydrological and geological factors. This can help determine appropriate interventions. First come the naturally and physically water-abundant areas in the Gangetic plains of Bihar, Uttar Pradesh and West Bengal; the eastern plateau; and the east coast plains of Odisha. Flood control and protection works will be highly effective in such regions that see high to moderate rainfall. Focus should also be given to afforestation to

SEVERAL PONDS HAVE BEEN CREATED IN THE CATCHMENTS OF HOT, ARID REGIONS WITH EXTREMELY LIMITED RUNOFF, LEADING TO DRYING UP OF STREAMS AND WATER BODIES

Mass poverty is back in India

THE PANDEMIC struck India at a time when it recorded its lowest economic growth in over a decade. The slowing economy had disproportionately impacted the rural areas, where the majority of the country's consumers and poor people reside. Even in the absence of any official data, one could perceive a rise in rural poverty. Unemployment was high; there was a constant decline in consumption expenditure; and public spending on development was stagnant. These three factors together dictate the well-being of an economy.

Cut to 2021. Rural Indians—mostly an informal workforce and poor by any accepted definition—have lived with irregular jobs for over a year. Anecdotal stories of precarious survival are available in abundance. People are cutting back on food items; many have stopped buying the basics like lentils as food inflation has spiked. The Mahatma Gandhi National Rural Employment Guarantee Scheme is no longer able to absorb demands for employment. Many are digging into their meagre savings. With the second wave of the pandemic hitting hard, it is a situation of extreme desperation. One can argue all economic activities of the poor and the marginally well-off have ceased. What does this result in?

The Pew Research Center using the World Bank data has estimated that the number of poor people in India with income of US \$2 per day (or less in purchasing power parity) has more than doubled—from 60 million to 134 million—in just a year due to the COVID-19 pandemic-induced recession. This means after 45 years, India is back in a state where

it can be called a “country of mass poverty”.

With this, India's uninterrupted progress in poverty reduction since the 1970s has stalled. Last time India reported an increase in poverty was in the first quarter-century after Independence. From 1951 to 1974, the share of the poor increased from 47 to 56 per cent in the total population. In recent times, it had emerged as the country with the highest poverty reduction rate. The global Multidimensional Poverty Index reported in 2019 that India lifted 271 million citizens out of poverty between 2006 and 2016.

India has not counted its poor since 2011. But in 2019, the United Nations estimated that 364 million people in the country, or 28 per cent of the population, were poor. All the estimated new poor people due to the

After reducing poverty rates for 45 years, India has added the maximum poor in 2020

pandemic are in addition to this. Also, as evaluations point out, millions of people in urban areas have also slipped below the poverty line. Moreover, the Pew Center's analysis says even the

middle class has shrunk by one-third. Overall, cutting across population and geographical segments, millions of Indians have either become poor, poorer, or are on the brink of becoming poor.

Is this a temporary phase? The usual belief is that with economic recovery, many people would climb above the poverty line. But the question is how? People have reduced spending or are not able to spend. They have already exhausted their savings, reducing their capacity to spend in the future. Government spending is also not proportionate to the crisis. This means a perpetuation of the current economic situation. And a way out of it is not certain, just like the pathway of the pandemic. **DTE**

 @richiemaha



CERTIFICATE COURSE ON

IMPROVING ENVIRONMENTAL PERFORMANCE OF COAL-BASED THERMAL POWER STATIONS

Course date: May 11th – May 14th, 2021 **Course time:** 10.00 a.m. to 5.00 p.m. **Last date for applying:** April 20, 2021

THIS TRAINING IS FULLY FUNDED BY CSE

HIGHLIGHTS

Course duration: 4 days **Offered by:** School of Industrial Pollution and Governance, AAETI
Fees: Fully funded by CSE **Selection procedure:** Shortlisting through CV/Nominated by Govt

The coal-fired thermal power industry is considered one of the most polluting sector. Apart from emitting particulate matter, sulphur dioxide, and nitrogen oxides, they are also responsible for spewing over a third of the country's GHG emissions into the air. They use half of the country's drinking water, and produce one of the largest waste streams – fly ash. To control emissions from the sector in 2015, the government imposed strict pollution limits

on the industry. The coal-based thermal power sector is now under pressure to reach the limits as soon as possible, sail through the water-scarcity risk, and reduce climate threats. Trained manpower is necessary to support this sector at the moment.

To aide which CSE is offering a merit-based four day full-scholarship advanced training program: **Improving environmental performance of coal-**

based thermal power stations. The residential training workshop will be organized at the Anil Agarwal Environment Training Institute (AAETI), Alwar, about 100 km from Delhi. The objective of the workshop is to update the participants about the new norms and their applicability, train them on pollution control, reduce climate change impacts, and familiarize them with best practices and operation and maintenance issues.

THE COURSE HIGHLIGHTS

- Minimizing pollution - particulate matter control, sulphur dioxide and oxides of nitrogen
- Reducing GHG emissions and improving energy efficiency
- Better fly ash management
- Water management in thermal power stations - water audits, recycling techniques
- Continuous emission monitoring system; how to ensure quality data
- Case studies, experience-sharing and discussion sessions
- Site visit.

TRAINING METHODOLOGY

Classroom lectures, case studies, class exercises, discussions and field visits

COURSE VENUE

Anil Agarwal Environmental Training Institute (AAETI), Tijara, Rajasthan about 100 km from Delhi. Participants have to reach New Delhi at their own expenses on May 10th, 2021 and May 15th, 2021 (return).

For registrations and other details, please contact:

Soundaram Ramanathan

Deputy Programme Manager

Industrial Pollution Unit

Centre for Science and Environment, 41, Tughalabad Institutional Area, New Delhi -110062

Ph: 91-11-2995 5124 (Ext. 301); Fax: 91-11-2995 5879, Mobile: +91 85271 56760

Email: soundaram@cseindia.org

Down To Earth

YouTube channel

2,57,000
subscribers



▶ Subscribe 

to common sense...

or visit <https://youtube.com/c/downearthmagazine>