1-15 JULY, 2021

Down To Earth

FORTNIGHTLY ON POLITICS OF DEVELOPMENT, ENVIRONMENT AND HEALTH

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WORLD'S BIGGEST ANIMAL DISEASE OUTBREAK



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P24



ONLINE TRAINING ON

UNDERSTANDING ENVIRONMENTAL LAWS FOR BETTER ENVIRONMENTAL MANAGEMENT

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

Course fees: INR 2500

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

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

Learning from the Programme

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

Course Objective

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

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

Who can apply?

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

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

Course Organizer

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

Silent pandemic needs agenda for change

WE ARE living in unprecedented times. An RNA—not even DNA—has brought the world economies to a halt. Amid these disruptions, we must focus on another pandemic—one that is not so obvious today but threatens our health systems in ways that we cannot even imagine. This silent pandemic is the rise of antimicrobial resistance (AMR). It is as catastrophic as COVID-19 or climate change. Just imagine the scale of human tragedy if we lose the ability to get well—if medicines stop working, and if diseases cannot be treated. This is what AMR inflicts upon us.

It is a fact that the current health crisis, the pandemic, has taught us some lessons and thereby, it provides us an opportunity to set our house in order before it burns down. Firstly, it has put health at the centre of the global agenda. Today, equitable and universal access to vaccines has gained prominence; we are realising inter-dependence and, most importantly, the cost of inaction in public health. We know today that the rich cannot be protected from the virus unless the poor have protection—inclusive and equitable health care is essential. Secondly, we understand more than ever the role and the value of prevention. COVID-19 has brought out the role of clean water in the preventive agenda. The Indian government has included access to clean water and sanitation as part of the health sector's spending. Clearly, we know that prevention will be key in current and future health pandemics.

We also know that countries of the South—I would argue, also the already rich countries of the North—must realise that the approach of first chemicalising and toxifying the environment and then investing in its repair is unaffordable and unsustainable. Our world, in particular, has many competing priorities—from providing universal healthcare to delivering education to all. It is, therefore, even more critical that we learn to do things differently; we have to walk the paths that others have not taken yet—leapfrog and reinvent pathways for growth without pollution. This is where the environmental challenge of AMR needs to be understood.

Thirdly, we know now that COVID-19 and AMR are the results of our dystopian relationship with nature; it is about the way we grow our food and manage our environment. There is a massive use of antimicrobials and antibiotics in growing food—from crops to livestock and fish farming. The problem is that this practice of using antibiotics to promote growth and control diseases has been widely abused in the "modern" food manufacturing system.

The rise of anti-microbial resistance is as catastrophic as COVID-19 or climate change

It has become part of the toolkit for enhancing productivity and is justified—as was the use of pesticides and other chemicals for many years—as being critical for the livelihood security of farmers. What this assertion ignores is the fact that antimicrobials are used indiscriminately in the case of what can be called "intensive" livestock farming. The use or misuse of antibiotics is then about the very system of food—how animals are reared; if they have access to the outdoors; how many are stocked (housed) in the facility; and how more resilient breeds are disappearing (biodiversity in the food world). It boils down to our diets. It is, therefore, wrong to pose this as a simple issue of productivity versus sustainability.

Clearly, this food and environment pathway, which adds to AMR, needs to be addressed. It needs strategies that are preventive and affordable. This is when the emerging world has many critical and competing challenges—all of which need to be managed simultaneously. We have to increase health access to our people. We need access to life-saving medicines. We have to increase food productivity and ensure that farmers get livelihood security. But conversely, we cannot afford the high cost of clean-up after contamination.

Therefore, it is imperative to discuss the next agenda for change. One, to ensure that antimicrobials critically important for human health are not used for livestock or for crops. You may call this the "conservation agenda". The next is "development agenda", which must ensure that we continue to increase food production without indiscriminate use of antimicrobials. And then the "environmental agenda", which is to ensure that the waste from the pharma industry and other sources like fish or poultry farms is tracked and contained. Given that in our world farm waste is never a waste but a resource for the land, we need to prevent the use of antimicrobials so that reuse and recycling of manure is possible. So, we must conserve the critical list of antimicrobials; we must minimise their use and we must invest in prevention so that we do not have to use these medicines for maintaining our health. This is another make-or-break agenda for our world. DTE @sunitanar

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

Engage



Ensure smooth rollout of vaccination drives

As the vaccination drive against COVID-19 began on January 16, with healthcare and frontline warriors getting the first shots, every Indian began to eagerly wait for his or her turn. India's robust vaccination drives have been rolled out with all safety and efficacy precautions, thereby ensuring that the efforts do not go in vain. The excellent work of Indian scientists and technicians in making available the vaccines in the shortest possible time deserves praise.

One wishes that the nationwide vaccine programme continues to sail smoothly till every citizen is vaccinated. In fact, our leaders should focus on building trust and transparency, and not politicisation, even as the Union health ministry prepares itself to clarify questions relating to any safety concerns arising during the ongoing programme. Moreover, it is also paramount to ensure that the distribution of COVID-19 vaccines across India goes on smoothly without any hindrance in order to showcase to the world that the country is ready to help nations across the world do the same.

K R SRINIVASAN
SECUNDERABAD, TELANGANA

More trees, more life

This is with reference to "The real oximeter" (1-15 June 2021). Trees are the natural source of oxygen. The life journey of a tree begins with a seed in the nursery. The odds of the tree surviving are linked directly to what it undergoes in the nursery. While millions of seeds are planted in nurseries every year, there is little to no information available on the quality of the plants. Could this be because there is no record of them in the first place? The survival rate of planted trees has to be monitored so they can be improved and ensure that the natural production of oxygen improves.

VINAY
VIA EMAIL

↘ India needs a national institute for environmental sciences and technology related to global climate change research. Through integrated graduation, post graduation and doctorate programmes, the country will gain trained environmental engineers, biotechnologists and agro-environmental scientists. This is the need of the hour.

K P SINGH
VIA EMAIL

Tighten reins on fly ash

This refers to "Fly ash breach incidents on the rise amid proposal on deadline extension: CSE", published online on June 17, 2021. The notification to extend deadlines for fly ash utilisation seems very poorly thought out and utterly lacks the sense of a real plan to tackle this issue. The flexible provisions are so poorly considered. This regulation offers incentives to underperformers without asking them to invest in any innovation and/or technology as compensation. This



is a perfect scenario to employ market-based mechanisms in policy design (a fly-ash market similar to a carbon market) that will be much more efficient in attaining the set out goals if implemented properly. It also drives innovation in the industry by a providing a direct financial incentive to players who perform better. A little competition among players also gives them a reason to keep each other honest.

LOVE GOYAL
VIA EMAIL

Get full picture on compulsory licences

This is in reference to "Why is India afraid of compulsory licences?" (16-30 June 2021). The article fails to mention the stance of the US and the EU on compulsory licensing for Pfizer-BioNTech's vaccine. It is also silent on India and South Africa's proposal at the World Trade Organization to waive intellectual property rights for COVID-19 vaccines. The article's headline, too, contradicts facts.

BABLOO BHAUMIK
VIA EMAIL

Group farming a great option

This is in reference to "Collective response" (1-15 June 2021). Collective farming may be the best option for small farmers even after the pandemic is over. Robert Owen attempted this in the UK and the US around the 1830s.

SAMEER RAO
VIA EMAIL

DTE TV

Cheetahs to return to India after 60 years

The cheetah, which was officially declared extinct in the 1950s in India, is about to make a comeback later this year. The



Kuno-Palpur Wildlife Sanctuary will get eight cheetahs, five of which are females, from the Endangered Wildlife Trust in South Africa. However, experts are worried the sudden arrival of cheetahs will disrupt the biodiversity of the grasslands. Moreover, with this project, Kuno-Palpur will be home to four big cats—lions, tigers, cheetahs and leopards. It remains to be seen whether they can co-exist in the same habitat.

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Digest

WHAT'S INSIDE

Renewable energy firm lights up remote areas of the Northeast **P10**

Cradle of Chipko movement, Raini, demands relocation **P11**

What's behind the recent surge in pink alpine snow **P12**

1,000 WORDS VIKAS CHOUDHARY



Scenes of COVID-19 protocol violation such as overcrowding at public spaces and improper use of masks, as seen here at the Sarojini Nagar Market in New Delhi, have become common as the national capital opened up in the first week of June following nearly two months of lockdown. On June 18, the Delhi high court took *suo motu* cognisance of such violations, saying market associations and street vendors must ensure strict adherence of COVID-19 protocols. Traders' groups reacted to the court's order saying the city administration is responsible for crowd control beyond shops and markets.

FOR MORE PHOTOS, SCAN

Return of the light

A private enterprise provides solar power to remote villages of the Northeast

DAKSHIANI PALICHA

EVERY YEAR, as soon as July approaches, the residents of Morigaon town in Assam prepare to leave their houses. The onset of monsoon in the state invariably causes floods in the region, forcing people from the town and nearby villages to temporarily relocate to shelter houses on higher ground. For those who fail to make it, depend on the lone rescue boat operated by the Morigaon Mahila Mehfil (MMM), a women-led non-profit organisation in the town. MMM has since 2007 been offering ferry services to people during floods using the boat that it received as a donation. However, during heavy rains that cause prolonged power outage in the region, the boat could not navigate the waters and locate people when it got dark, leaving many stranded until the next morning. Communication also dropped since mobile phones could not be charged.

In 2019, Envo Renewable Energy Services Private Limited, a Guwahati-based company that provides solar power solutions, helped MMM by fitting the rescue boat with seven solar-powered lights and a five-point mobile phone charging station.

"We first partnered with MMM in April-May 2019, to solarise a child adoption centre it had set up in Morigaon. After learning about its other initiatives, we wanted to offer more solutions," says Fazle Illahi, founder and managing director, Envo.

Envo and MMM have also set up four integrated energy centres (IECs)—solar-powered charging units for portable solar lights and mobile phones. The company collaborated with SELCO Foundation, a non-profit based in Bengaluru for this initiative.

Set up in 2018, Envo works with local government departments and non-profits such as SELCO, CLEAN, World Resources Institute and Centre for North East Studies and Policy Research on similar initiatives to bring solar energy to remote villages of Assam, Meghalaya and Arunachal Pradesh.

"After working in the banking sector for many years, I wanted to return to Assam and do something for the underserved communities here. Energy, that plays a pivotal role in daily life, was in poor supply. So I decided to bring electricity to those areas that are overlooked or are not easily accessible," Illahi says. Since 2012, Illahi tried his hand at various ventures in the renewable energy sector before establishing Envo.

The company works to improve energy access in four categories: households; community spaces (powering street lights) and rural schools (computer/audio-visual centres); rural healthcare centres; and livelihood solutions (businesses operating sewing machines, printers). After setting up the systems, the company hands over maintenance to the local people for a nominal charge, thereby incentivising community participation in sustaining the initiatives. The success Envo saw in the initial efforts to provide household and community lighting gave it mileage to take up more innovative projects. "For instance, one of our first projects with SELCO was solarising the 'boat clinics' in Assam that transport healthcare professionals and equipment to remote villages along the Brahmaputra river. We provided power to run the medical equipment on the boats," Illahi says.

"Our ultimate goal is to provide energy solutions that are sustainable and that raise peoples' standard of living. We now plan to venture into Nagaland as well," he adds.



WEATHER

Heavy rains devastate Raini village

RESIDENTS OF Raini village in Uttarakhand's Chamoli district, once a perfectly habitable place, are now desperate to leave. They are tired of living under the constant threat of being washed away.

The most recent disaster in Raini happened on June 13, after excessive rains raised the water level in the Dhauliganga river near the village and it overflowed. The rains damaged several houses as well as the statue of Gaura Devi, the pioneer of the Chipko movement that began at Raini and aimed at protecting trees



marked for government-backed logging.

Just outside Raini village, on the Neeti-Malari route, 40 metres of the road caved in, cutting off communication for the village inhabitants as well as the Indo Tibetan Border Police, who were unable to reach the Indo-Tibetan border outpost. As on June 23, 2021, Chamoli district had received 453 per cent more rainfall than normal, according to data from the India Meteorological Department.

This comes close on the heels of flash floods that rocked the village on February 7 this year. The flash flood in the river Rishiganga, a tributary of the Ganga, was triggered by a glacier burst and had washed away six residents of Raini.

While the authorities are looking at temporary resettlement solutions, residents are demanding complete relocation of the village to a safer spot. They fear such incidents are only going to increase in the future.

DISASTER

Food industry hit by central America drought

BARELY A month into the official summer season in the Americas, droughts have crippled central America, especially the US and Brazil, with its effects resonating globally. The US has experienced drought-like conditions since the beginning of 2021, as per the US Drought Monitor. As on June 15, nearly 39 per cent of the country is under drought, including California, Arizona, Nevada, New Mexico, Colorado, Oregon and Utah. The dire conditions have endangered the fish population as well as derailed crop-sowing in states such as Oregon and Colorado. The drought in Brazil, dubbed its worst in 90 years by the government, has more wide-reaching effects. Drier-than-normal conditions have hit the country's major export crops—corn, coffee, soybean and sugar. The shortfall in supply raised global food prices in May, estimates the United Nations. The damage to coffee will likely last till 2022, say experts.

COVID-19

Justice during pandemic

JUDICIAL INTERVENTIONS to avoid COVID cases in prisons continue to be largely ineffective across the world. In India, social activist Medha Patkar told the Supreme Court on June 19 that its order to states to form committees for decongesting prisons by providing inmates interim bail or parole has not helped elderly prisoners because most panels have not considered vulnerability to the virus while deciding on the release. In the US, overcrowding saw 400,000 COVID-19 cases among inmates as on June 21, as per COVID Prison Project. A University of Texas at Austin study published on June 17 says delayed judicial process led to COVID-related deaths of 18 prisoners in the state in 2020. In the UK, legal experts have criticised a fast-track procedure that led to prosecution of over 4,000 people for COVID-19 offences. Crown Prosecution Services, UK's agency for criminal prosecution, says over 700 cases tried under the single-justice procedure (SJP) may be wrongly charged. SJP rulings are made by a magistrate without a trial.

QUERY

Why alpine snow is pink

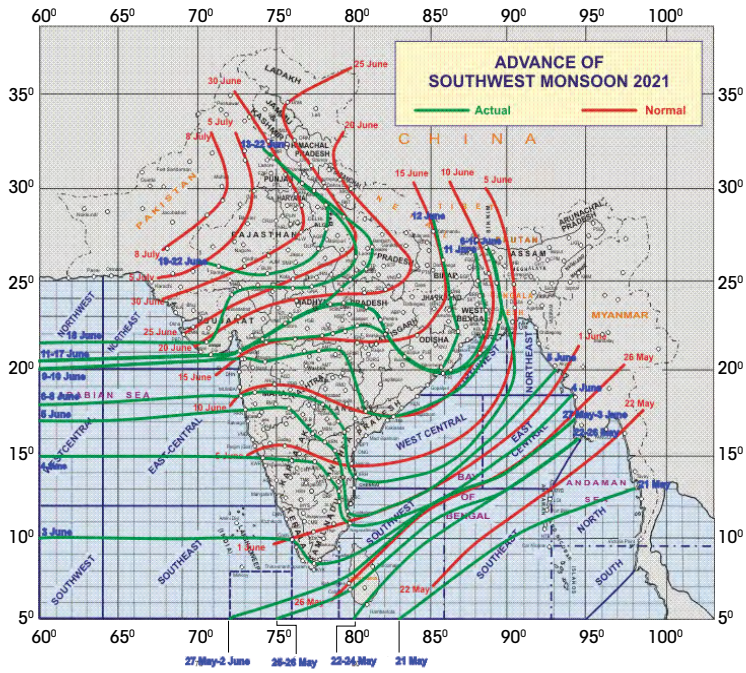
1 What is pink snow? Also dubbed as watermelon snow or glacier blood, it is a large set of blooms of a snow-algae named *Chlamydomonas nivalis* found in the high alpine regions. The algae has a chemical pigment called astaxanthin that gives a pink colour to the glaciers.

2 How often does this algal bloom occur? Snow-algae blooms in the spring, and has been seen many times over the last few centuries. However, in recent years, there has been a sudden increase in its occurrence. Such blooms absorb more heat, causing the snow to melt rapidly. To understand what spurs them, scientists have studied algae on the French Alps.

3 What did they find? The scientists are still not sure about the reasons behind the spurt. However, they believe it could be because of unusually warm weather and sewage runoff—factors that contribute to freshwater and ocean algal blooms. They have carried out a census of algae on the French Alps and identified some species growing at different altitudes.

MONSOON TRACKER

States such as Karnataka, Maharashtra, Gujarat, Madhya Pradesh and Uttarakhand saw an early arrival of the Southwest Monsoon. As on **June 22**, India saw **37 per cent** surplus rainfall, with the northwest recording the highest surplus at **76 per cent**



Source: India Meteorological Department, as on June 22, 2021

BITS GLOBAL

The US on June 17 announced a $3 billion programme to develop antiviral medication to fight the coronavirus during the early stages of infection. The Antiviral Program for Pandemics will speed up trials on a few promising drug candidates to treat COVID-19; some of the pills could be ready by the end of 2021. The initiative will also support research on entirely new drugs for not just the coronavirus but also other viruses that could potentially cause pandemics in the future.



The UK opened its National Infrastructure Bank in the city of Leeds on June 17. The bank will focus on tackling climate change, investing in projects on clean energy, sustainable transport, digital, water and waste solutions. The bank will initially have £12 billion ($16.7 billion) as capital to deploy for its investments.

Australia on June 21 rejected a proposal to build a large-scale renewable energy hub over environmental concerns. The Asian Renewable Energy Hub, proposed by a consortium of four global renewable energy firms, planned 26 gigawatts of wind and solar power in the Pilbara region to produce hydrogen and ammonia. However, it would have impacted tidal movements and native species, said Australia's environment minister.

A parliamentary committee on June 20 recommended that the Bangladesh government to make environmental damage a punishable offence by treating "ecocide" on the same lines as genocide. Ecocide is the destruction of the natural environment and ecosystems by deliberate negligent of human action. The panel also sought focus on keeping deforestation rates in Bangladesh below the global average.

BITS INDIA

Through a statement to the United Nations on June 20, the Union government defended its new information technology rules and said concerns over the law's violation of human rights are "exaggerated".The Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 came into force on May 25, but several activists and groups say the rules violate people's rights to privacy and freedom of speech.

The Union Ministry of Social Justice and Empowerment on June 17 launched 14 early intervention centres across the country for people with disabilities. The centres include services such as screening and referral for rehabilitation; speech therapy, occupational therapy and physiotherapy; parental counselling and training; and peer counselling.



US-based non-profit organisation Malaria No More on June 14 announced a collaboration with the India Meteorological Department (IMD) and the Indian Council of Medical Research (ICMR) to create an India Interagency Expert Committee (IEC) on Malaria and Climate to eliminate the disease. The non-profit will use IMD's meteorological data and ICMR's public health information to predict malaria patterns that will help tackle the disease.

The Union Cabinet on June 16 approved the Deep Ocean Mission, which has been in the pipeline since 2018. It will come under the purview of the Union Ministry of Earth Sciences.The six components of the mission are: mining deep ocean nodules for minerals; developing an advisory to understand climate change variables; studying deep-sea flora and fauna; identifying sources of hydrothermal minerals; designing desalination plants for offshore thermal energy production; and training experts in ocean biology.

FRAMEWORKS

■ The Ministry of Environment, Forest and Climate Change has issued the **Environment (Protection) Amendment Rules, 2021** that extend deadlines for the Centre to consider objections raised on projects and to impose restrictions/prohibitions, in view of delays caused by the COVID-19 pandemic.

■ The Ministry of Road Transport and Highways has issued the **Central Motor Vehicles (Thirteenth Amendment) Rules, 2021**. The amendment specifies the vehicles that must comply with emission standards and the penalties owners must pay in case of non-compliance.

■ The Karnataka Renewable Energy Development Limited has issued the **Draft Karnataka Renewable Energy Policy 2021-2026**. It aims to develop new renewable energy projects in the state and increase investment for the same.

IN COURT

NATIONAL GREEN TRIBUNAL

■ The National Green Tribunal (NGT) has ordered action on restoration of Bum-Rukn-ud-Dowla, a water body in Hyderabad, Telangana. NGT took up the case in 2018 when alerted about dumping of waste and sewage in the water body.The state pollution control board is yet to take action.

■ NGT has asked the Environment Impact Assessment Authority and the Chief Wildlife Warden, Haryana to file a status report on a case regarding granting of environmental clearance to a housing project within prohibited distance from two wildlife sanctuaries in Panchkula district.

■ NGT has sought responses from the Ministry of Environment, Forest and Climate Change (MoEF&CC) and the Ministry of Mines, Power and Coal in a case against a notification by MoEF&CC in 2020, permitting use of coal with higher ash content.

SUPREME COURT

■ In a case related to demolition of unauthorised structures on forest land at Khori Gaon, Faridabad, Haryana, the Faridabad Municipal Corporation has assured the Supreme Court that it will take all actions under the due process of the law. It will also consider the claims for rehabilitation that the occupants of the structures have made.

HIGH COURT

■ The Directorate of Animal Husbandry and Veterinary Services, Tamil Nadu, has filed a letter with the Madras High Court detailing measures taken to protect stray animals in the state during the pandemic.This submission was in a case related to the welfare of the animals amid COVID-19 restrictions.The court has said that the department must make a plan for general treatment of animals even during normal times.

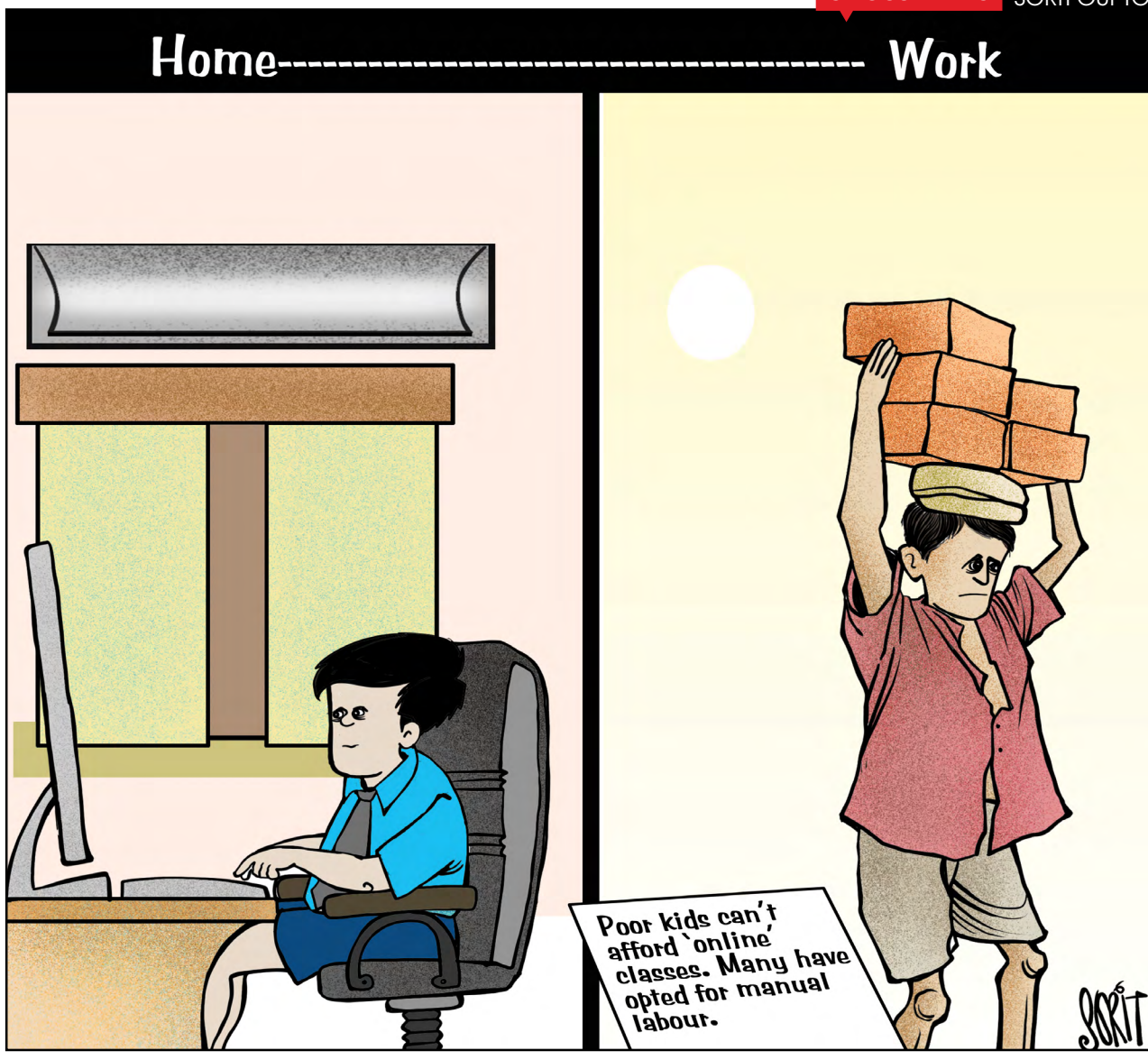
So far...

Number of cases on environment and development tracked from January 1 to June 18, 2021

NATIONAL GREEN TRIBUNAL	SUPREME COURT	HIGH COURTS
176	57	104

FOR DETAILED VERDICTS, SCAN

CROSS HAIRS SORIT GUPTO



BIG NUMBER

18 million

children and adolescents work at electronic waste dumpsites in low- and middle-income countries and are at the risk of several health hazards

Source: Children and Digital Dumpsites: E-waste Exposure and Child Health by the World Health Organization

VERBATIM



"CLIMATE CHANGE, LIKE THE CORONAVIRUS, RECOGNISES NO BORDERS OR POLITICAL IDEOLOGIES. WHEN ONE NATION IS IMPACTED, ALL FEEL THE PAIN."

PATRICIA ESPINOSA

Executive Secretary, United Nations Framework Convention on Climate Change, urging developed nations to extend financial aid to developing nations to enable their green transitions at the 60th Global Environment Facility Council meeting on June 14

Compiled by Raju Sajwan, Sanjit Kumar, K M Sheeja, Susan Chacko and Dakshiani Palicha

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IT'S A CLIMATE CRISIS."

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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.

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The pandemic has increased India's biomedical waste by 20 per cent

HEAP OF TROUBLE

Under-reporting, poor segregation and lack of awareness ail India's COVID-19 waste management. The pressure is set to further increase with the nationwide vaccination drive

SIDDHARTH GHANSHYAM SINGH
NEW DELHI

WITH COVID-19 prolonging its stay and spread, the face of litter is fast changing in the country. One can easily spot surgical masks, face shields, gloves, shoe covers and personal protective equipment, or PPE, being disposed of as part of household waste or lying discarded by the roadside, behind hospitals, on beaches, in parking lots, in landfills and even in crematoriums, occasionally burning alongside the pyres. This waste could harbour the novel coronavirus and other infectious pathogens, and be as hazardous to humans and the environment as any hospital waste such as bloody bandages, biological material, syringes and scalpels would be.

Due to this inherent potential risk of COVID-19 litter, the Central Pollution Control Board (CPCB) categorised it as hazardous biomedical waste as soon as the pandemic tightened its grip over the country.

PHOTOGRAPH: REUTERS

Since March 2020, CPCB has issued guidelines from time to time under the Bio-medical Waste (BMW) Management Rules, 2016, and reviewed them to ensure that COVID-19 waste is collected with utmost caution and transported to "biomedical waste treatment and disposal facilities", specifically designed to handle biohazardous waste from hospitals, health camps, morgues, pathological and clinical laboratories, and other medical establishments and activities (see 'Rising to the challenge'). In May 2020, CPCB also launched a mobile application, COVID-19 Biomedical Waste Management (BWM) App, to keep a tab on this fast-growing waste stream in real time.

A back-of-the-envelope calculation of the data collected by CPCB using the BWM App shows that the country has generated some 45,954 tonnes of COVID-19 waste in the past one year till May 10, 2021. Meaning, since the pandemic's first wave, it has generated 126 tonnes of COVID-19 waste a day—this is about 20 per cent of the 614 tonnes of biomedical waste that the country generates on any given day.

On the face of it, the country seems to be well equipped to handle this additional load. In a report submitted to the National Green Tribunal (NGT) on January 14, 2021, CPCB says the country's 198 common biomedical waste treatment and disposal facilities and the several such captive facilities in hospitals together have a capacity to treat 826 tonnes of biomedical waste a day. By comparison, in May 2021, when CPCB reported maximum COVID-19 waste generation, the total biomedical waste generated reached 800 tonnes a day—well under the national treatment capacity.

Then why are the country's landfills changing their hues?

Rising to the challenge

India has been proactive in issuing guidelines for the management of COVID-19 biomedical waste

March 19, 2020
Central Pollution Control Board (CPCB) releases its guidelines on COVID-19 biomedical waste handling which spells out the waste management system that needs to be instituted for hospital isolation wards

March 25
First review of the guidelines issued on waste handling measures that need to be observed by quarantine centres beyond healthcare facilities

April 18
Second review mandates that waste water generated in the treatment facilities be managed appropriately

May 1
CPCB releases the COVID-19 BMW application for treatment facilities and waste generators to update their output. Supreme Court makes reporting through the application mandatory on July 30

June 6
Third review issued to address the growing concerns over the safety of waste handlers and the need for protective gear for sanitary workers and others involved in the waste management systems

July 14
In the final review, the pollution control board addressed the issue of segregation of general and biomedical waste in quarantined households

Source: Various government and media reports

The essential tweaks

Steps to better manage COVID-19 biomedical waste

- Intensify **awareness** among citizens and enforce **segregation at source**
- Ensure **all** waste generators and processors are **registered on COVID-19 BWM App**
- Limit the **use of PPE kits** and other single-use paraphernalia **only to frontline workers**. Promote the use of re-usable/cloth masks among the general public
- Use washable utensils in quarantine camps/ homes to minimise waste
- **Plug the gaps in the guidelines** through regularly updating them
- The Central Pollution Control Board (CPCB) should **provide data that segregated according to generation sources, waste types and treatment facilities**. Doing this will help strategise for any outbreaks or pandemic waves
- CPCB should also **reflect on the rural scenario** in terms of quantum of generation and the general practices followed to dispose of the COVID-19 biomedical waste
- Ensure that **vaccination camps outside hospitals segregate** the waste properly
- As per Bio-Medical Waste Management Rules, 2016, **bar-code the bags used for collecting biomedical waste** for tracking the source of the waste once it reaches the treatment facility. Kerala is one of the few states that has been bar-coding its waste bags and this has been a major part of its response towards the pandemic

DATA DEFIES DATA

Consider this. In its January 2021 report submitted to NGT, CPCB mentions that Lakshadweep has a treatment capacity of 72 tonnes a day, even though the board itself has stated that the archipelago does not have a single common biomedical waste treatment facility. While CPCB has not come out with a clarification about this erroneous data, it indicates that the actual treatment capacity of the country is 754 tonnes a day, and not 826 tonnes. This simple correction brings down the biomedical waste processing capacity of the country closer to its actual generation of COVID-19 waste. Moreover, at 754 tonnes per day, the treatment facilities are highly insufficient to handle any surge in COVID-19 waste, like that witnessed in September 2020 or in May 2021.

The picture appears grim when one compares the waste generated by individual states with their treatment capacity. A careful analysis of CPCB's January and May 2021 reports suggests that 22 of the 35 states and Union Territories generate more biomedical waste than they can handle. The capacity of facilities to treat biomedical waste is nearly saturated in Maharashtra, Goa, Manipur, Andhra Pradesh, Meghalaya, Rajasthan and others.

In May 2021, when India recorded the maximum number of new cases, COVID-19 accounted for 33 per cent of the biomedical waste generated across the country. This seems to have particularly overwhelmed an already-strained biomedical waste treatment infrastructure. The volume that month was massive at places. In Haryana, COVID-19 waste was responsible for 47 per cent of the biomedical waste, followed by Chhattisgarh (42 per cent), Himachal Pradesh (40 per cent), Andhra Pradesh (40 per cent) and Delhi (39 per cent) (see 'Too much to handle' *p*20).

All these are just the tip of the iceberg. There is a clear indication that the 45,954 tonnes of COVID-19 waste collected by CPCB is a gross underestimation of the actual volume of waste generated so far.

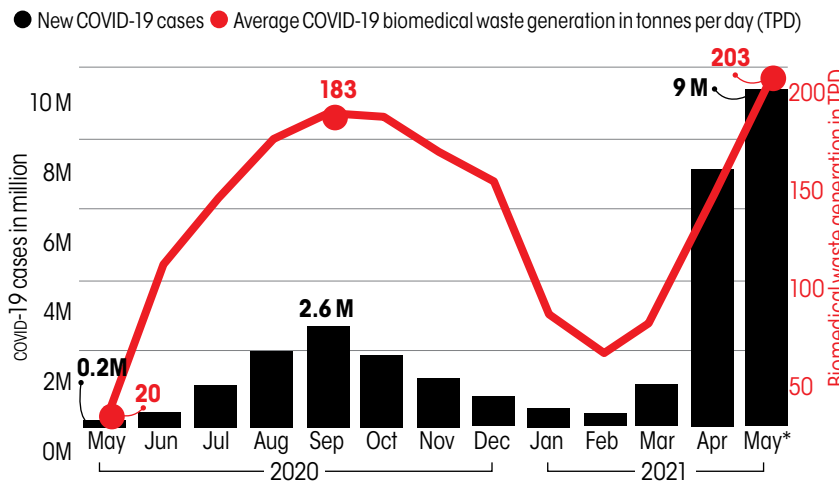
FAILING IN CATCH-UP

Last year, in September the country generated 183 tonnes of COVID-19 waste in a day, the highest at the time. This year, the peak was in May with 203 tonnes a day, as per CPCB. While this increase of 11 per cent suits the narrative of the pandemic's second wave being more infectious than the first wave, it has not kept pace with the COVID-19 caseload that rose by an astounding 234 per cent during the period (see 'Disproportionate increase').

Strangely, the data, when disaggregated, suggests that India's per capita COVID-19 waste generation (waste generated by one infected person) during the second wave has reduced by one-fourth from the first

DISPROPORTIONATE INCREASE

While new cases increased by 234 per cent, COVID-19 biomedical waste generation went up by 11 per cent between the peak months of the two waves



* Waste generation data only till May 10, 2021; Source: Central Pollution Control Board

WIDELY UNDER-REPORTED

Despite it being mandatory, only a small percentage of generators share waste details on the government mobile application, COVID-19 BWM App

Month	Number of treatment facilities* using the App	Number of generators# using the App
August 2020	**150**	**Over 5,000**
September 2020	**174**	**6,800**
October 2020	**181**	**6,800**
November 2020	**184**	**100,000** (approx)
December 2020	**184**	**8,000** (approx)
May 2021	**168**	**5,084**

* India has 198 registered common biomedical waste treatment facilities.
#List of generators include 106,643 bedded healthcare facilities in the country, and the individual households that are under quarantine. The municipal body must update the household data in the App.
Source: Central Pollution Control Board

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PROGRAMME DESIGN

Date: 11th August 2021 (9.30AM – 1.30PM)
Theme: Sustainable Water Management
Water Sensitive Urban Design and Planning, Rainwater harvesting, Green Infrastructure and Nature Based Solutions, Urban Lake Management, Water and Communication, Tools and Approaches for Citywide Water management, Mainstreaming Water-Energy Nexus in Wake of Climate Change, Green Infrastructure Knowledge Conclave 2020

Date: 12th August 2021 (9.30AM – 1.30PM)
Theme: Sanitation, Wastewater and Faecal Sludge / Septage Management
Tools and Approaches for Citywide Sanitation, Citywide Inclusive Sanitation, City Sanitation Plans & Faecal Sludge Management, Excreta Flow Mapping – Shit Flow Diagrams, Decentralised Wastewater Treatment including Local Reuse, SaniPath, Water and Sanitation Safety Plan, SFD Week Knowledge Conclave-2019

Date: 13th August 2021: Aspirational Talks by Invited Global and National Experts

First Session: 10AM – 12.30PM
Theme: Sustainable Water Management and Technical Session

Dr John Cherry - Distinguished Professor Emeritus, University of Waterloo, Canada
Dr Veena Srinivasan - Senior Fellow- ATREE, Bangalore, India
Anusha Shah - Director Resilient Cities, Arcadis, UK
Tony Wong, Professor - Monash University, Australia
K. Madhavan - Chief Executive Officer, WaterAid, India
Aloka Majumdar - Head CSR HSBC, India
Dr Kala Vairvamoorthy - Executive Director, IWA, India

Second Session: 3PM – 5.30PM
Theme: Sanitation, Wastewater and Faecal Sludge/ Septage Management

Dr Kate Medicott - Team Leader - Sanitation, WHO, Switzerland
Juliet Willetts, Professor - University of Technology, Sydney, Australia
Christoph Luthi, Professor - EAWAG SANDEC, Switzerland
Dorai Narayana - International Consultant FSM, Malaysia
Arne Panesar - Head Sanitation Programme - GIZ & Sustainable Sanitation Alliance (SuSanA), Germany

If you are an Alumni of CSE – SWW or CSE institutional partner and interested to be a speaker at the Impact workshop to share your experience on above mentioned objectives, kindly submit a short abstract (max 500 words) of your presentation before 18th July, 2021 to the undersigned coordinators.

- Top 10 impactful alumni will be awarded a Certificate as "Water Champion"
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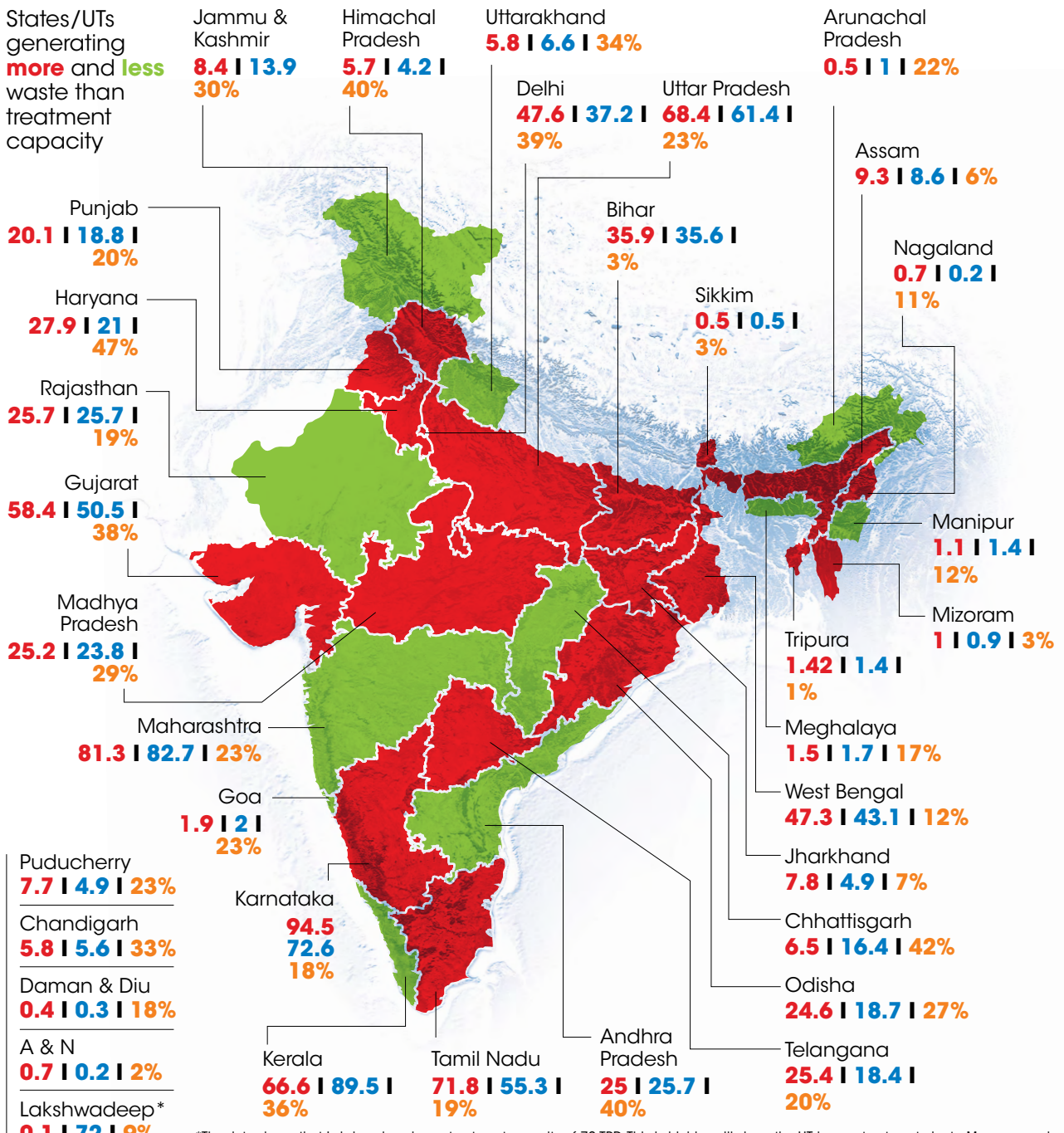
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TOO MUCH TO HANDLE

As many as 22 states/UTs have generated more biomedical waste than their treatment capacity during the pandemic's second wave

00 Total biomedical waste generated in tonnes per day (TPD) **00** Total treatment capacity (TPD)
00 % share of COVID-19 biomedical waste in the total



*The data shows that Lakshwadeep has a treatment capacity of 72 TPD. This is highly unlikely as the UT has no treatment plants. Map prepared on the basis of biomedical waste generated in December 2020 and COVID-19 waste generation in May 2021. Ladakh data unavailable
Source: Central Pollution Control Board

wave. On an average, a COVID-19 patient generated 0.49 kg in May 2021 as compared to 2.09 kg in September 2020. CPCB in its COVID-19 waste management status, released on May 11, 2021, offers an explanation. "Despite the increase in the number of patients, there is non-proportional growth in the quantity of COVID-19 biomedical waste generated. This is mainly due to the proper segregation of waste," it notes.

While CPCB's logic sounds plausible, many fear that such reduced generation could also be due to under-reporting of data. "The number of used vials, syringes and other COVID-19 waste we are receiving is nowhere close to what is being generated by the pandemic," says the owner of a biomedical waste treatment facility in north India, who does not wish to be named.

MISSING WASTE

A major challenge in monitoring the flow of COVID-19 waste is its innumerable sources that vary from individual households to isolation centres and makeshift quarantine camps. This is the reason CPCB requires COVID-19 waste generators such as health centres and quarantine homes, biomedical waste treatment facility operators, urban local bodies and pollution control authorities in states and Union Territories to regularly feed in data related to generation and treatment in its BWM App. On July 30, 2020, the Supreme Court, based on the report submitted by the Environmental Pollution (Prevention and Control) Authority (EPCA), also passed an order that makes reporting through BWM App mandatory. Yet, very few have registered themselves on the application so far, and even fewer are reporting on a regular basis.

As per CPCB's January 2021 report to NGT, till December 2020, as many as 184 of the 198 common biomedical waste treatment and disposal facilities were updating their waste handling data on BWM App. The number has reduced to 168 in May this year (see 'Widely under-reported' *p*18).

Waste generators have fared even worse on this account. A conservative estimate shows that there are over 106,600 bedded healthcare facilities in the country that must update their COVID-19 waste data daily on the BWM App. Then there are the COVID-positive households, whose details need to be fed into and updated in the App by municipal corporations or village *panchayats*. Yet it was only once in November 2020 that 100,000 generators, the most so far, shared their information on the BWM App. In all other months, their number was between 5,000 and 8,000. The gap is clearly too huge to be an expected variation. Even in May 2021, when India accounted for almost half of the world's new cases single-handedly, only 5,084 generators had shared their data on the App.

Such gross under-counting and under-reporting of COVID-19 is a matter of worry because of the changing geography of the infection from urban to rural areas, where mechanisms to track patients in real time are almost non-existent. And this is the basis for setting up systems for collection of biomedical waste from individual households.

A GAP TOO DEEP

At places where COVID-19 waste finds its way to treatment facilities, lax regulation defeats the purpose. Consider this. The BMW Management Rules, 2016, require healthcare facilities to follow a colour-coded segregation system for waste

DO IT THE RIGHT WAY

Generated from the diagnosis, treatment or immunisation of humans and animals, hazardous biomedical waste needs to be segregated and handled separately from general waste



Yellow category

USED FOR

Anatomical, chemical and soiled waste, lab waste and medicines

METHOD OF DISPOSAL

Incineration at temperatures between 800 and 1,050°C or plasma pyrolysis, a thermal process that uses high temperature in an oxygen starved environment to dissociate waste, or deep burial in rural or remote places



Red category

USED FOR

Contaminated plastic waste such as used tubings and bottles

METHOD OF DISPOSAL

Sterilised using autoclaving, a process that uses high-pressured boiling water, followed by recycling. The waste should not reach landfills



White category

USED FOR

Sharps, usually metal, waste such as needles and fixed syringes

METHOD OF DISPOSAL

Autoclaving, followed by shredding or mutilation and encapsulation in metal or cement containers to be sent for final disposal to iron foundries or designated pits



Blue category

USED FOR

Broken, discarded or contaminated glassware

METHOD OF DISPOSAL

Disinfection by soaking and cleaning with sodium hypochlorite or through autoclaving and other process before recycling

Source: Bio-medical Waste Management Rules, 2016

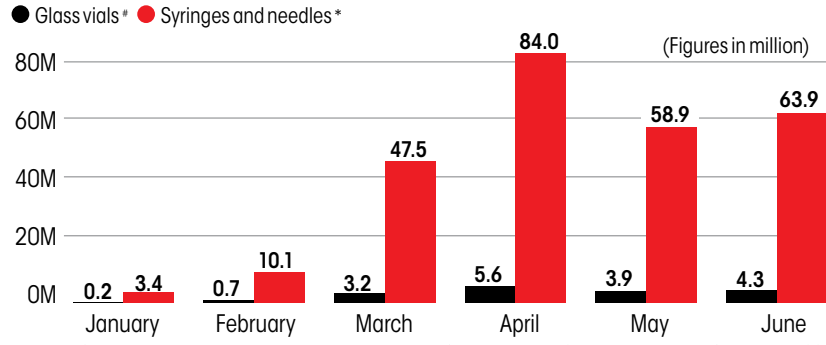
disposal and hand it over to treatment facilities within 48 hours (see 'Do it the right way', *p*21). At treatment facilities, a considerable part of the waste, that comes in red and blue bags or in white containers, is channelised for recycling after sterilisation. Only a small amount of the litter, particularly pathological and laboratory wastes, that comes packed in yellow bags, is sent for incineration. While healthcare facilities follow the protocol during disposal of COVID-19 waste, no such segregation system is in place for home quarantine centres. The guidelines do mention discarding of PPE kits, goggles and other paraphernalia in the red bag, but do not mention its distribution in home quarantine centres. As a result, these quarantine centres are provided with only yellow bags. Due to poor awareness and lack of communication, these facilities throw everything from food waste and disposable cutlery to masks, PPE kits and gloves into yellow bags, which are then sent for incineration.

Because of poor segregation, an alarmingly high quantity of plastic waste is now being incinerated. "This results in scaling on the inner lining walls of incinerators, which eventually decreases the efficiency," says the biomedical waste treatment facility owner. Burning of plastics also releases noxious gases like dioxins and furans, but there is no way to monitor the pollution. EPCA in a July 2, 2020 report, submitted to the Supreme Court, states that an "online continuous emission monitoring system has been installed in most central biomedical waste treatment facilities, but this is not working to satisfaction."

INDIA WILL GENERATE OVER 1.3 BILLION USED SYRINGES, NEEDLES AND MORE THAN 100 MILLION DISCARDED GLASS VIALS TO VACCINATE ITS ENTIRE ADULT POPULATION

ADDING TO THE BURDEN

India's COVID-19 vaccination drive has so far used close to 268 million syringes and needles, and almost 18 million glass vials



#One vial on an average carries 15 vaccine doses (Covishield has 10 doses a vial while Covaxin has 20)
*The number of syringes is equal to the number of vaccine doses administered. Source: Our World in Data

BREWING CHALLENGE

Biomedical waste is generated not just during the treatment of the disease but even in the attempts to prevent it. India began administration of COVID-19 vaccines on January 16, 2021, and as of June 21, has administered 289 million doses. While this is good news, it is also concerning as every jab generates a waste syringe, and every 10 or 20 vaccinations, depending on the vaccine type, generate one waste glass vial. All these are biomedical wastes (see 'Adding to the burden'). Due to insufficiency of vaccine vial monitors that display key indicators, especially storage temperature while stocking and transportation, a considerable amount of vials have to be discarded after four hours of opening. This challenge is prevalent in the rural parts of India. The use of auto disabled syringes ensures safety of vaccine beneficiaries and healthcare staff, as it restricts the use of syringe twice. However it also generates massive quantities of biomedical waste which the country will have to deal with in the coming months.

By the end of the vaccination drive, which the Centre hopes to reach by the end of this year, the country would have generated over 1.3 billion used syringes, needles and more than 100 million discarded glass vials, that would require careful disposal as per the COVID-19 vaccines operational guidelines released on December 28, 2020. While this sub-stream of biomedical waste need not be incinerated, it does require treatment and sterilisation before being channelised to the authorised recycling facilities. Statewise autoclaving capacity of the country will be of key concern in this context. Treatment plant operators say a lion's share of the plastic, metal and glass components from vaccination centres is sold off to local dealers by support staff at vaccination centres, which indicate lack of training and awareness among the support staff.

No stone should be left unturned in the safe handling and disposal of COVID-19 waste to ensure that it does not snowball into the next crisis. DTE

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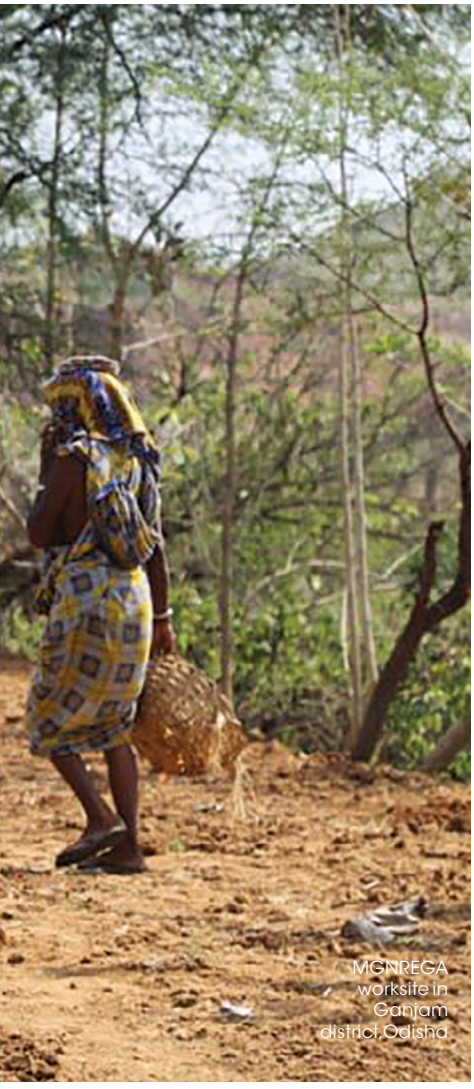
WAGES OF FEAR

Extend guaranteed employment to 150 days to prevent rural distress from aggravating

JUGAL MOHAPATRA AND **SIRAJ HUSSAIN**

LAST YEAR, during the first wave of the COVID-19 pandemic, when the country watched millions of informal workers trudging back to their villages due to lockdown-induced job losses, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) emerged as a safety net for the distressed rural households. Between May and July 2020, the scheme generated the highest number of employment recorded since its launch in 2005. There was, undoubtedly, a surge in the demand for unskilled manual works under MGNREGA as few other employment opportunities were available in rural areas. But at the same time, people were less fearful of venturing out to seek work as rural India

PHOTOGRAPH: PIB



MGNREGA worksite in Ganjam district, Odisha

detected. In May alone, rural districts accounted for more than 50 per cent of the new cases and deaths in all large states except Gujarat, Kerala and Karnataka.

How has this "geographic shift" of the pandemic impacted the implementation of MGNREGA, and thereby people's livelihoods?

Understanding this is crucial at a time when studies indicate deepening poverty levels and soaring unemployment across rural areas. A recent report, *State of Working India 2021*, by the Azim Premji University, Bengaluru, estimates that during March-October 2020, rural poverty increased by 15 per cent as compared to the seven months preceding the study period and pushed 150 million more people into impoverishment. Rural unemployment has spiked from 6.15 per cent to 10.63 per cent between March and May 2021, contagious infection and the prospect of income loss, it also offers clues as to how the safety net can be utilised to ensure livelihood security for rural households during such times of crises.

First, let's analyse the demand for MGNREGA works in April 2021. A simple comparison of data available on the MGNREGA portal would show that it surged 104 per cent more than the demand recorded during the same month last year. But this is misleading as the recorded demand in April 2020 was only for one-third of the month; it may be recalled that between March 25 and April 20, 2020, almost every economic activity, including MGNREGA works, remained suspended because of the stringent nationwide lockdown. So, we compare the figures with that of April 2019, and find that the demand for MGNREGA works during

RURAL UNEMPLOYMENT WAS WIDESPREAD DURING THE SECOND WAVE. WHILE IN APRIL, SPREAD OF THE PANDEMIC WAS NOT SEVERE ENOUGH TO DAMPEN THE DEMAND FOR MGNREGA WORKS, THE SITUATION CHANGED DRASTICALLY BY MAY

had remained largely unscathed by COVID-19. Administrative apparatus at the *panchayat* level was also not fully engaged in the management of the pandemic and could implement the livelihood support scheme.

All this changed during the second wave, when the virulence of the pandemic shifted from urban to rural areas (see 'Troubled interiors', 1-15 June, 2021). In April and May 2021, rural districts—where at least 60 per cent of the population resides in rural areas—accounted for 45 per cent and 53 per cent, respectively, of the new cases states the Centre for Monitoring Indian Economy.

SECOND WAVE'S DOUBLE BLOW

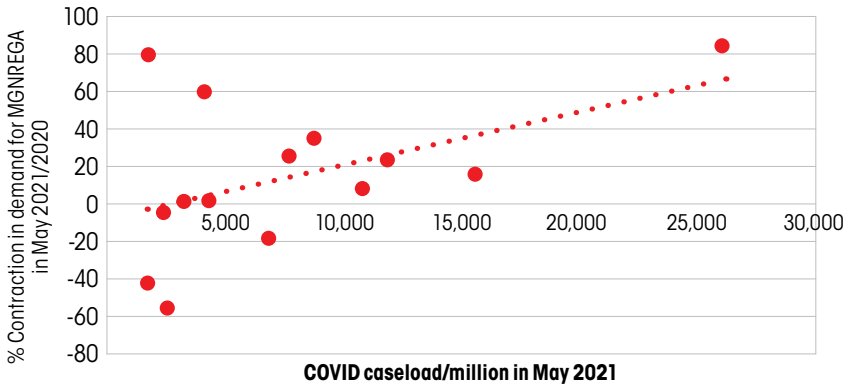
To assess the impact of the second wave of the pandemic on rural livelihoods, we have compared the demand for MGNREGA works during April and May 2021 with that of the corresponding months the previous year, both at the state and the district levels. Our findings show that the demand pattern not only offers an insight into what it takes to survive when caught between a

April 2021 registered an increase of 30 per cent. This increased demand suggests that unemployment was widespread in rural areas during the second wave. It also indicates that spread of the pandemic in April was not severe enough to dampen demand for MGNREGA works.

The situation, however, changed drastically by the next month, when the rural spread of COVID-19 intensified further. At the macro level, the demand for MGNREGA works contracted by 26 per cent as compared to May 2020. A state-level analysis, however, showed a

HOW SECOND WAVE HITS RURAL LIVELIHOOD

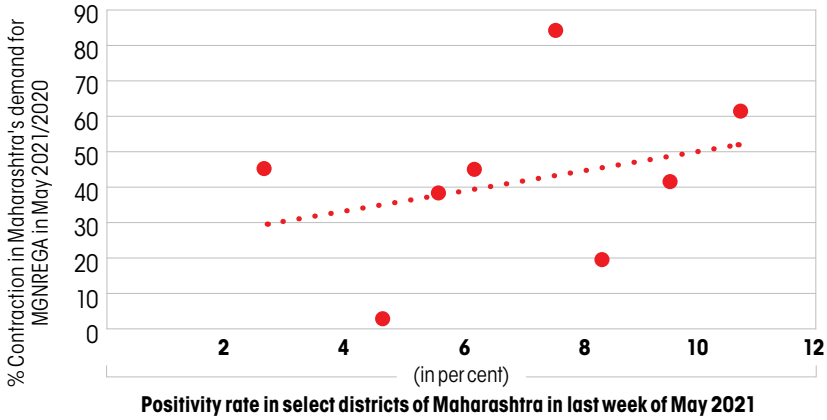
Demand for MGNREGA works contracted in states battered by COVID-19



Source: MoRD & www.covid19india.org

AT PLACES, PULL FACTOR DAMPENED DEMAND

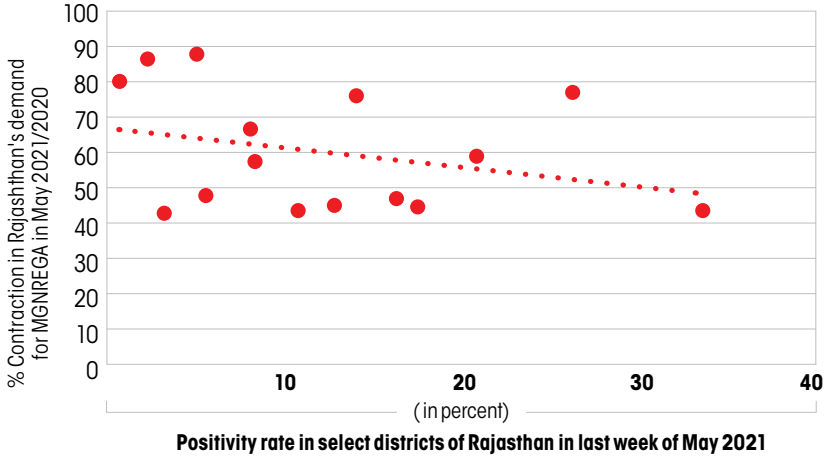
In Maharashtra, fear of infection reduced MGNREGA demand



Sources: Ministry of Rural Development; Ministry of Health and Family Welfare
Note: Districts selected on the basis of high demand for MGNREGA works

AT OTHERS, PUSH FACTOR NULLIFIED PULL FACTOR

In Rajasthan, people risked life to secure subsistence livelihood support



Sources: Ministry of Rural Development; Ministry of Health and Family Welfare
Note: Districts selected on the basis of high demand for MGNREGA works

varied trend (see 'How second wave hits rural livelihood').

We have analysed the demand for MGNREGA works in 17 large states for May 2021 and compared the figures with demands during the month last year. We find that the demand for MGNREGA works had increased in Madhya Pradesh (5 per cent), Odisha (19.5 per cent), Assam (42 per cent), Jharkhand (57 per cent) and Gujarat (a humongous 722 per cent). It remained more or less unchanged in Bihar and Telangana, which reported less than 1 per cent of demand contraction. In remaining states, demand contraction ranged from 8 per cent in Andhra Pradesh to 82 per cent in Kerala.

Since the spread of COVID-19 too is not uniform across the country, we have further compared the demand contraction in states with the caseload for that month, and found a positive correlation between the two. In states like Assam, Jharkhand, Madhya Pradesh and Odisha, where the spread of the pandemic was less severe in May 2021, rural households could benefit from MGNREGA works. But in states where the caseload was high, the people did not venture out for MGNREGA works, resulting in a demand contraction.

The wide variation in demand contraction prompted us to probe further and explore to what extent the severity of the pandemic influenced people's decision to seek livelihood support schemes.

We have conducted district-level analyses for Rajasthan and Maharashtra, where rural districts accounted for 73 per cent and 61 per cent of the new cases detected in May 2021. While Rajasthan had shown a 59 per cent demand contraction in May 2021, for

Maharashtra it was 35 per cent. The districts were selected on the basis of high demand for MGNREGA works. By comparing the districts' positivity rates (a proxy for severity of the spread of infection) in the last week of May 2021 with the year-over-year change in work demand for the month, we have observed a contrasting pattern.

In the selected Maharashtra districts, severity of the pandemic's spread when compared with the demand contraction for MGNREGA works shows a positive trend. This suggests steep demand contraction at places where the infection was severe (see 'At places, pull factor dampened demand', *p*26). Contrary to expectation, the correlation is negative for Rajasthan districts, with the trend suggesting a moderate demand contraction at places with high spread of infection (see 'At others, push factor nullified pull factor', *p*26). What could be the reason for this anomaly?

IT'S LIFE *V* LIVELIHOOD

The demand for MGNREGA works by rural households in a pandemic situation is primarily determined by two factors. One, the compulsion to secure subsistence livelihood support notwithstanding the risk of infection (a *push factor*). Two, the apprehension among MGNREGA job-card holders to expose themselves to the risk of infection while seeking work, particularly in areas of high positivity rates (a *pull factor*).

The analysis of Maharashtra and Rajasthan districts shows that both the "push" and the "pull" factors are at play in all districts. And the overall effect on the demand for MGNREGA works depends on which of the two factors is dominant in a region. In the selected districts where we observe an increase in demand in May 2021 as compared to May 2020, the "push factor" appears to have neutralised the "pull factor"; whereas in the districts with significant contraction, the "pull factor" possibly dominates and dampens the demand for work.

WIDEN SAFETY NET, NOW

This understanding should be part of India's contingency plan to support rural livelihoods in the event of a third wave of the pandemic, which experts warn could hit the country during the second half of the year. Though the ongoing kharif season is expected to generate sizeable opportunities for work, these will taper off around September. By then, due to substantial coverage of COVID vaccination, the "pull factor" among MGNREGA job-card holders would be less severe. But the "push factor" that drives households to demand MGNREGA works will remain, as the period between November and March is also the lean season for labour demand in agriculture. So there is an urgent need for the government to widen the safety net for rural households by enhancing, among other measures, the guarantee limit of MGNREGA from 100 to 150 days.

PROVIDING 7.2 MILLION RURAL HOUSEHOLDS THE EXTRA 50 DAYS OF EMPLOYMENT MAY REQUIRE SUPPLEMENTARY PROVISION OF ₹10,000 CRORE, WHICH SHOULD BE SEEN AS A FISCAL PRUDENCE

In the past, such a dispensation has been allowed in regions affected by natural calamities, such as droughts, floods and cyclones. Since COVID-19 has been treated as a disaster under provisions of the Disaster Management Act, 2005, the Union government would be well advised to follow the past precedent and increase household entitlement limit of work days under MGNREGA to 150 days for the financial year 2021-22 for the entire country, as the pandemic has not spared any geographical region.

Going by the past records, the highest number of households that have availed 100 days of work in a year has been around 7.2 million, recorded in the financial year 2020-21. Now, let's assume that the same number of households would seek work during the entire entitled limit of MGNREGA this year also—in the current financial year, only 0.15 million households have completed 100 days of work under MGNREGA up to June 17, 2021. Providing these 7.2 million households the extra 50 days of employment may require supplementary provision of around ₹10,000 crore (at the current cost of providing a person day of work).

During a pandemic, this order of additional financial support to the most deprived and vulnerable rural households need not be seen as a breach of reasonable norm of fiscal prudence. DTE @down2earthindia

(Jugal Mohapatra retired as Union Secretary, Ministry of Rural Development. Siraj Hussain, visiting senior fellow at International Council for Research on International Economic Relations, Delhi, was Union Secretary, Ministry of Agriculture)

FORGOTTEN CONTAGION

Viruses, it seems, are at war with life forms. While the world is struggling with the novel coronavirus, another one has been killing pigs, decimating the global pork and animal feed trade. African swine fever, a century-old disease that infects pigs and wild boars with a near 100 per cent fatality rate, has claimed a third of the world's pigs since 2018. Its latest victim is India, where cases have been reported since May 2020 but have exploded in the past couple of months. Since there is no cure or vaccine, the infected animal has to be culled. With most piggeries in Asia being small-scale and the spread of the virus showing no signs of abating, what are the implications for pig farmers and the global trade of the world's primary source of protein?

RICHARD MAHAPATRA tracks the latest surge of the disease with **VIVEK MISHRA** and **SHAGUN KAPIL** in New Delhi, **ADAM SAPRINSANGA** in Aizawl, **MOA JAMIR** in **Dimapur** and **SOBHAPATI SAMOM** in Imphal



PHOTOGRAPH: ADAM SAPRINSANGA

India's northeastern states account for nearly 47 per cent of the country's over 9 million pig population. In 2021, African swine fever cases have been reported in Meghalaya, Mizoram, Manipur, Nagaland, Arunachal Pradesh and Assam

"A BULLET TO the forehead." In the past few months, pig farmers in Mizoram have come to dread hearing this sentence. But Thanliana and his three sons had little choice. Having lost 308 of their 500-odd pigs to a "fever" since April, they finally informed the state's Animal Husbandry and Veterinary Department, whose officials visited their piggery in Sateek village, on the outskirts of state capital Aizawl, on June 18. They were accompanied by two armed policemen dressed in personal protective equipment or PPE.

Veterinary officer Esther Lalzoliani had already identified the pigs' symptoms as African swine fever (ASF), a viral haemorrhagic disease that is known to infect pigs and wild boars, with a near 100 per cent fatality rate. The infected animals develop fever and their skin turns purple, with watery discharge from the eyes and severe, bloody diarrhoea before death. With no cure or vaccine, isolation or culling are the only ways to curb the spread of this highly contagious disease which transmits through direct contact with sick animals or from anything contaminated—water, soil, feed, objects like shoes, vehicles and farm equipment, live or dead pigs or even pork products. That day, at Thanliana's piggery, 42 pigs were culled by the police, who used a pistol for the smaller animals and a rifle for the bigger ones.

"A third of the dead are sows that were part of the breeding stock and half of the lot culled was ready to be sold to the slaughterhouse," says Thanliana, adding that he has borrowed heavily to set up and expand the pig farm. "Every week for the past two months, we have been burying pigs by the dozen around the farm. I called the officials to save the rest of the stock," says P C Ramchullova, the eldest son of Thanliana. That day, too, the family dug trenches to help the team bury the animals, but had to hire an earth-mover to dig since the number of culled animals was quite high.

India does not have a history of African swine fever. It reported its first outbreak to the World Organisation for Animal Health in May 2020, with cases coming from Arunachal Pradesh and then Assam

Lalhmingthanga, joint director of the animal husbandry department and nodal officer for monitoring the outbreak in Mizoram, who was accompanying the team, estimated the loss at ₹10.3 lakh. "It is a rudimentary estimate," he says, "the overall loss would be higher, accounting for person-days lost looking after the pigs, the cost of medicines and the earth-mover, among others." Esther and Lalhmingthanga have become used to culling-burial-loss estimation process as ASF sweeps across India's northeastern states, which account for nearly 47 per cent of the country's 9.06 million pig population and where pigs are a major source of live-lihood and a significant part of the local diet and culture.

India does not have a history of ASF, though the disease was first described almost a century ago (*more on this later*). It reported its first outbreak to the World Organisation for Animal Health (OIE) in May 2020, with cases reported from Arunachal Pradesh and then Assam. A few months later, on June 24, 2020, the Centre intimated the state governments about the Department of Animal Husbandry and Dairying's "National Action Plan for control, containment and eradication of ASF" and asked them to take "suitable action".

Cases started to rise again this year, with Lungsen village in Mizoram's Lunglei district reporting a pig death from an unknown disease on March 21. On April 15, the National Institute of High Security Animal Disease, Bhopal, confirmed it as the first case of ASF in the state. By June 10, the viral disease had spread to Meghalaya, Mizoram, Manipur and Nagaland, says the Food and Agriculture Organization (FAO)'s *ASF Situation in Asia and Pacific Update*. In Mizoram, the government data shows ASF has caused severe losses, claiming more than 8,130 pigs in 10 of the state's 11 districts by June 29. With every culled

pig, the meat economy takes a hit. As per the Mizoram government's *Economic Survey*, the state's annual meat production rose from 13,158 tonnes in 2011-12 to 16,533 tonnes in 2019-20, of which pork accounted for almost half.

"As of now, the spread of the disease has largely remained under control because of COVID-19 lockdown restrictions. But given the virulence of the pathogen, it won't take long before spreading to other parts of the country. This will have a disastrous impact unless stringent biosecurity measures are implemented," warns Swaraj Rajkhowa, principal scientist at the Indian Council of Agricultural Research-National Research Centre on Pig, Guwahati. Such measures include thorough disinfection, proper disposal of carcasses and waste, movement control, surveillance and early detection and humane killing of animals, as per OIE, which classifies ASF as notifiable disease.

The virulence of the disease stems from the fact that it is caused by a double-stranded DNA virus that is fairly large, genetically diverse and is talented at evading the immune system. The Food and Agriculture Organization (FAO) says ASF virus, when in a suitable protein environment, can survive in a range of pH and extreme temperatures. It has been shown to remain stable in serum at room temperature for 18 months, in refrigerated blood for 6 years and in blood at 37°C for a month. It may also remain viable in faeces for 11 days, decomposed serum for 15 weeks and in bone marrow for months. As a result, only certain disinfectants are effective in its control, says FAO.

Studies also show that ASF virus, when in a feed ingredients, can tolerate long-distance sea transports. This allows it to be easily spread and transmitted.

This complex makeup, apart from a general lack of willingness to invest in research until recently, are the reasons scientists have not been able to develop a cure or vaccine against the disease, despite knowing it for almost a century now.

QUICK SPREAD

African swine fever (ASF) today has 24 genotypes and they have all been identified in Africa

1909
Discovered in Africa
ASF was first observed in Kenya in 1910, but it was only later that studies confirmed that the disease was different from the classical swine fever. It was then seen in Zambia in 1912 and 1914, and reached South Africa in 1928. ASF is currently endemic in southern African countries

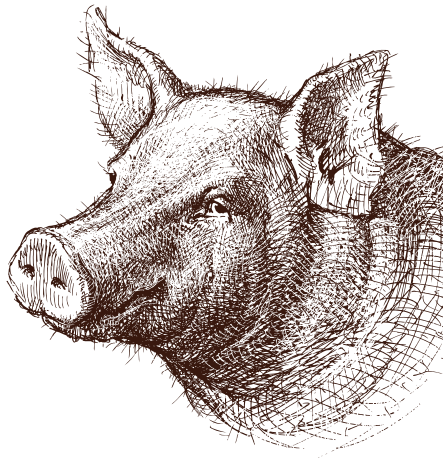
1957
Reaches Europe
Portugal reports ASF. In 1960, it spread to Spain, France and Italy, and remains endemic till 1995. It has now been eradicated in Europe with the exception of the Italian island Sardinia, where it has become endemic

1978
Spreads to South America
The virus first reached the Americas through Cuba in 1971, where 500,000 pigs were slaughtered to prevent its spread. Starting with Brazil in 1978, it spreads to Dominican Republic and Haiti. Currently spread under control

2007
Reported in Caucasus region & Russia
ASF found in pigs and wild boars in Georgia, and then to Azerbaijan, Armenia, Iran, Russia, Belarus

2019
Spreads across Asia
Close to 3,000 pigs across 83 farms culled between January and April to contain the outbreak. Vietnam culls close to 1.5 per cent of its pig population through 2019 to contain the outbreak. Large-scale culling reported in Hong Kong, North Korea (May), Cambodia (April), Laos (June), the Philippines (July), South Korea, Timor-Leste (September) and Indonesia (November). Many of the countries report multiple outbreaks and resurgences within the year

2020
Asia march continues
In May, India reported its first ASF outbreak to the World Health Organization after confirmed cases are recorded in Arunachal Pradesh. Since then the disease has spread to Assam, Meghalaya, Mizoram, Manipur and Nagaland. In Mizoram, Assam and Arunachal Pradesh, the disease has already killed 22,200 pigs. The burden of the disease is falling disproportionately on smallholders —for whom pig raising is often a critical livelihood mechanism and safety net—in absolute terms and on a per pig basis, thereby threatening increases in poverty, vulnerability, and food insecurity



Sources: World Animal Health Organisation (OIE); news reports



PHOTOGRAPH: ADAM SAPRINSANGA

^ A worker at Thanliana's farm buries culled pigs in a trench treated with lime. Thanliana owns one of Mizoram's largest commercial piggeries. The farm has lost over 300 pigs to African swine fever this year

DISEASE ORIGIN

ASF was first recognised after its introduction in domestic pigs to Kenya in 1910, as per Elsevier's *Encyclopedia of Virology*. In 1921, R Eustace Montgomery, veterinary adviser to the government of Uganda, established the likely transmission of ASF from wild swine. The virus is said to have evolved around 1700 AD from a virus of soft tick that infects wild swine, including giant forest hogs, warthogs and bush pigs.

In 1957, ASF appeared for the first time outside Africa (see 'Quick spread' *p*31), in Portugal, and in just a few decades, spread to other countries in Africa, Europe and the Americas, even reaching the Caribbean islands of Cuba and Haiti. It entered Asia in 2018, when China—the world's largest producer and consumer of pork—reported the first case. That year, nations rushed to declare it a "notifiable" contagious animal disease under OIE to be managed with national and international regulations and agreements.

India, however, remained free from the disease till 2020 despite its neighbours Bangladesh and Myanmar reporting ASF in 2018 and 2019. So how did the virus enter India?

PASSAGE TO INDIA

Understanding the source and route of the spread of a virus is important to plug the gap before it can spread to pandemic -like proportions. However, scientists have so far not managed to trace its foray into the country.

Some believe that the virus has arrived via Tibet. "In 2020, [during the first outbreak] OIE reported two epicentres in Tibet, on the border of Arunachal Pradesh. People reported big carcasses flowing in rivers crisscrossing the international border," A Chakraborty, director of research, North Eastern Regional Disease Diagnostic Laboratory, Guwahati, tells *Down To Earth* (DTE). Last year, most outbreaks were on these river banks. The carcasses might have been mauled by community dogs who then brought the virus to villages, he says. In July 2020, soon after Arunachal Pradesh and Assam reported the initial outbreaks of ASF, Rajkhowa had also told

COMMUNITY SANITATION THROUGH GREYWATER MANAGEMENT



Rural Drinking Water and Sanitation Department (RDW&SD) Karnataka has taken up initiatives to address Greywater Management (GWM) issues under SBM(G)'s ODF Plus initiatives. RDW&SD has given in-principle approval and released grants of Rs.205 Cr which is 25% of the total amount approved for GWM implementation under SBM(G) Phase II to 4464 Grama Panchayths across the state.

Grama Panchayths covered under SBM(G) Phase II

4464

Approval and grants released

₹205 Cr

RDW&SD had carried out a special campaign "Swaccha Grama, Swaccha Parisara" during the month of June 2020 under IEC and HRD activities in order to educate the rural mass regarding greywater usage in kitchen garden and its advantages in reclamation of water and reduce dependency on fresh water for non-potable usage.

RDW&SD is working towards prevention of water pollution by commissioning both nature based and cost effective engineered technologies such as Waste Stabilization Pond (WSP), constructed wet lands, sedimentation tanks to reduce the pollution load on natural water source.

Kodiyal Gram Panchayath of Haveri district has a population of 8500 and it resides by the banks of Tungabhadra river. Though the GP does not face water scarcity; the wastewater generated in the village was polluting the river. Zilla Panchayath, Haveri took up "Nirmala Haveri" campaign. Elected representatives, Gram Panchayath and local residents joined to address the issue of greywater by adopting a nature based technological option to treat the grey water before joining the river.

This pilot project is a combination of a two stage sedimentation pond followed with a constructed wetland as inline treatment and a bypass drain to address the wet weather flow. The local administration and engineers collected the necessary data, and based on the quantum of greywater generated the project was conceptualised. Suitable land was identified. Design and drawings were prepared with necessary approvals from the district administration and the pilot project was commissioned.



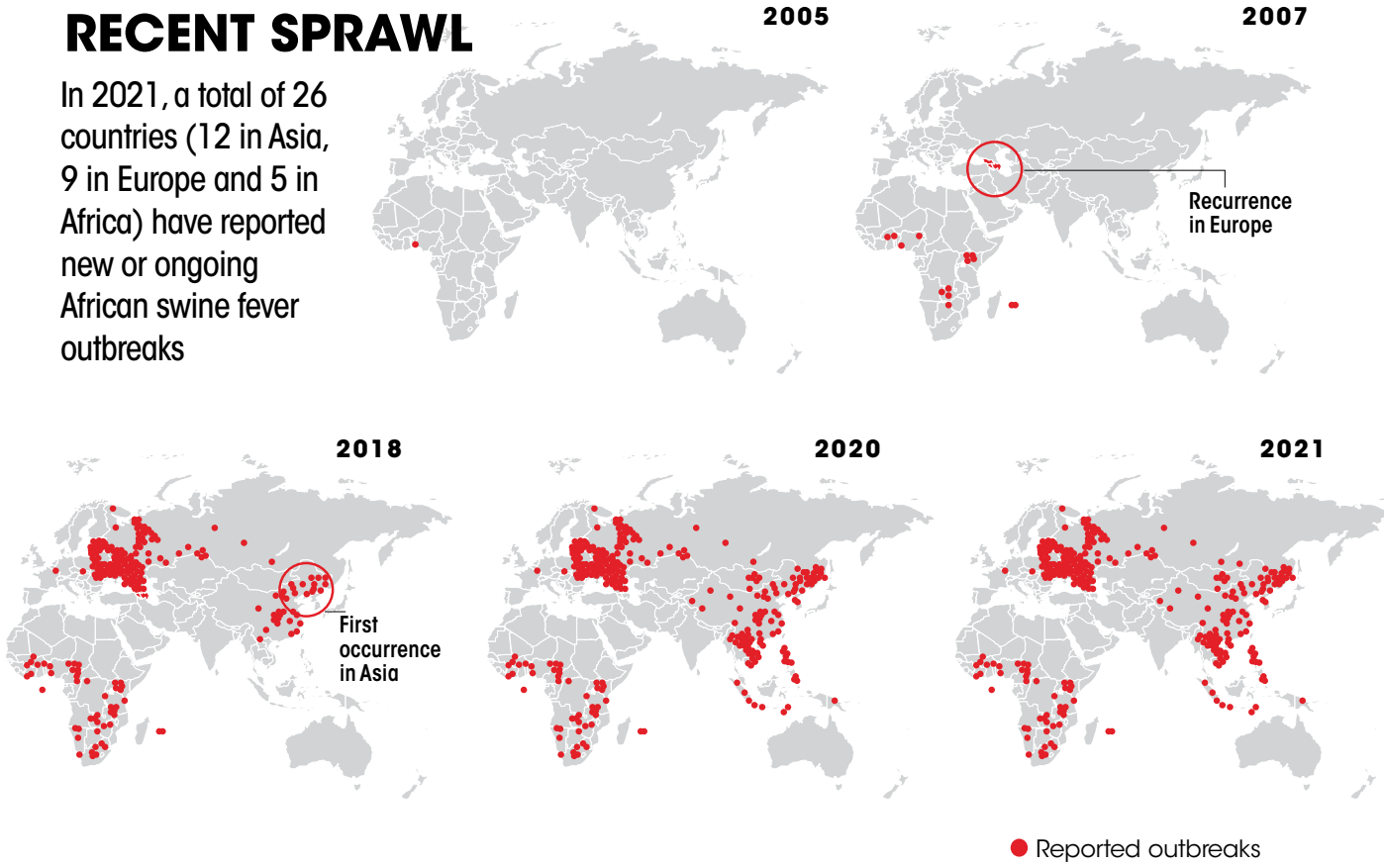
Let us efficiently manage liquid waste, avoid spread of diseases and create a cleaner environment.

Rural Drinking Water & Sanitation Department
Rural Development & Panchayat Raj Department

Har Ghar Jal Jal Jeevan Mission
JALOTSAVA
SWACHHA SANKEERNA
Clean India A Step Towards Cleanliness
parihara 9480985555

RECENT SPRAWL

In 2021, a total of 26 countries (12 in Asia, 9 in Europe and 5 in Africa) have reported new or ongoing African swine fever outbreaks



Source: *OIE international standards for ASF control and business continuity* by Gregorio Torres, Head of Science Department, OIE at World Trade Organization's Sanitary and Phytosanitary Measures Committee Thematic Session on African Swine Fever, March 23, 2021

DTE that the disease could have spread from Tibet.

Tapan Kumar Dutta, professor of microbiology at the Central Agricultural University College of Veterinary Sciences and Animal Husbandry, Aizawl, says there are several potential ways the virus might have spread to India. "It first reached China (in 2018), then Myanmar and then Bhutan. There is a possibility that our domestic animals might have contracted the infection from wild boars coming from bordering countries through forests." Praveen Mallick, commissioner, Department of Animal Husbandry and Dairying, also attributes ASF transmission to wild boars that easily cross over the border.

However, in states like Mizoram and Nagaland, that reported ASF this year for the first time, genesis of the outbreaks are shrouded in mystery.

INTRA-COUNTRY SPREAD?

Lalhmingthanga suggests that the outbreak in Mizoram's Lungsen village could have come from Bangladesh which, surprisingly, is not currently listed among FAO's "ASF reported administrative areas since August 2018". "The Village Council President at Rolui (just south of Lungsen) told us about pigs dying in various villages on the Bangladesh side of the border from the beginning of February. Lungsen is a village where pigs, illegally imported from Bangladesh, are kept along with the local animals. From Lungsen, the imported pigs are then supplied to Lunglei town," says Lalhmingthanga.

There was also an outbreak in Mizoram's Zokhawthar village, situated along the international border. It is a major hub of trade between Myanmar's Chin State and Mizoram. Although 250 pigs died at Zokhawthar, the outbreak was quickly contained and there have been no further reports from anywhere in the vicinity. Could it have come from Chin then?

While some officials suspect this, others say the virus may have come from within India, probably Shillong in Meghalaya, because fresh as well as smoked pork from there is a staple in Aizawl. Mizoram had banned pigs from other states as soon as ASF Arunachal Pradesh and Assam reported outbreaks. But state authorities admit it is nearly impossible to check every vehicle that crosses state boundaries.

Nagaland, too, had imposed such restrictions for nearly a year to avoid any ASF outbreak by imposing restrictions on pig movements from neighbouring states since April 2020. Five months later, it allowed pigs from Punjab and Haryana, but restrictions continued for Assam and Arunachal Pradesh. Officials are now clueless about how the disease reached the districts of Phek and Kiphire.

Researchers say the incursion of ASF into the densely distributed domestic pig population of this region, mostly reared under backyard and scavenging systems with poor biosecurity measures, is also a major threat to wild boars. A research paper in the journal *Pathogens* in December 2020, written by scientists working on animal diseases in India, representing various institutions, says, that "tracking down the first outbreaks of ASF in the NE [northeastern] region of India, it was observed that the outbreaks were reported alongside the river tributaries of Brahmaputra, a transboundary river which flows through Tibet, India, and Bangladesh. The Brahmaputra receives a number of tributaries that flows through national parks and wildlife sanctuaries of the northeast, comprising a significant number of wild boar population." Outbreaks can wipe out the pig population of the entire region if not appropriately controlled, they say.

While India is the latest geography to face African swine fever, China is the worst-affected. With outbreaks across the globe in the past three years, the disease has had huge economic implications

The research paper has a dire warning for the future: "From the NE pocket, the disease may further spread to eastern India and then to the mainland through the river routes and interstate movement of pigs for trade and commerce. Therefore, considering the existing high density of domestic pig population in India, there is every chance that ASF might attain an endemic status if not controlled critically."

GLOBAL SPREAD

India's northeastern region is the latest geography in the world to be gripped by ASF. Overall, 26 countries have reported the viral disease this year (see 'Recent sprawl'). Over two-thirds of the outbreaks have been in Europe this year. "This is the largest animal disease outbreak in history. We've never had anything like it," Dirk Pfieffer, veterinary epidemiologist at the City University of Hong Kong, was quoted by the *Associated Press*.

Currently, China is the worst affected. Shenyang, a city in northern China, reported the first case on August 3, 2018. By the end of 2019, or in just 16 months, it spread to rest of the country. The virus slipped into China from east Europe, in all likelihood through contaminated meat or pork products that were used as feed, also called swill feed. From there, it reached Vietnam, Cambodia, North Korea, Laos, Myanmar, the Philippines, South Korea, and, most recently, Timor-Leste and Southeast Asian countries.

Just like the human-impacting virus, this animal disease also demonstrates how fast it can spread in the interconnected world. Like in the case of the COVID-19 pandemic, this disease also has global economic impacts.

Ripple effect

Small farms in Asia are the worst hit by the outbreak, while global pork and feed markets fluctuate with fall and rise in China's pig numbers



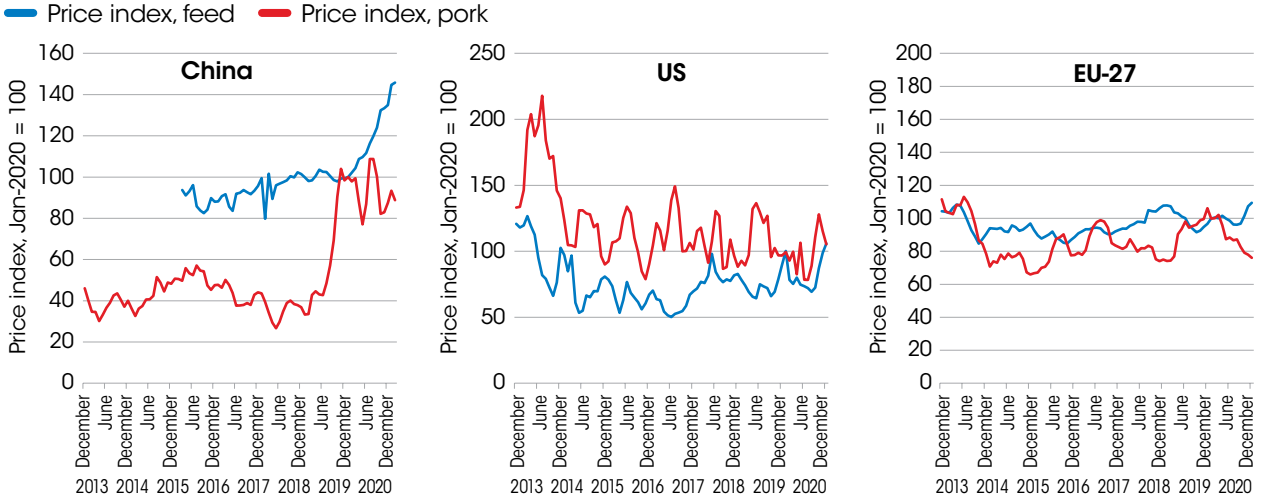
^ African swine fever has caused a 25 per cent dip in global pork production

PORK ACCOUNTS for 35-40 per cent of the global meat production. It is also a major source of protein with an annual consumption of more than 110,000 tonnes. Notwithstanding the rise of industrialised pig farming in developed and emerging economies, pig farms remain dominantly an affair of small-scale farmers. They are, therefore, the first victims of the outbreak.

In many countries, including India, where 70 per cent of the pig farms are owned by small-scale farmers as per the Department of Animal Husbandry and Dairying, backyard farms are closing and people are moving out of the business. In China, almost 98 per cent of the total pork production is by small-scale farmers who have fewer than 100 pigs each, according to 2016 data from the National Bureau of Statistics of China. *Evaluating Losses Associated with African Swine Fever in the People's Republic of China and Neighboring Countries,* an Asian Development Bank (ADB) report released in October 2020, had warned: "The burden of the disease is falling disproportionately on smallholders —for whom pig raising is often a critical livelihood mechanism and safety net—in absolute terms and on a per pig basis,

COST OSCILLATIONS

Price indexes for feed consumption and pork production (weighted by quantities of feed consumption/pork production in 2014-2016) show how markets have fluctuated in China since 2018



Source: Calculations based on data from Food and Agriculture Organization Corporate Statistical Database (FAOSTAT); Ministry of Agriculture and Rural Affairs (MARA), China; US Department of Agriculture; European Commission; www.pig333.com. Differences must not be interpreted as margins, but they allow to draw inferences on the change in margins

Note: From "The impacts of African Swine Fever (ASF) on global meat and feed markets" by Josef Schmidhuber Deputy Director, Markets and Trade Division, FAO, Rome

thereby threatening increases in poverty, vulnerability, and food insecurity."

Take the case of Vietnam. The small nation has culled 6 million pigs (20 per cent of its total population) since February 2018, as per the US Department of Agriculture (USDA). Given that its pig sector is valued at US $4 billion, the loss is huge and has mostly impacted small farmers. Do Tien Duy, associate professor, Faculty of Animal Sciences and Veterinary Medicine, Nong Lam University, Vietnam, tells DTE, "The story of ASF in China and other Southeast Asian countries is not like the story in Africa and European countries, because ASF never hit the domestic pig production so badly there. The disease is dangerous for smallholders."

Big, intensive farms have biosecurity applications and can survive an ASF epidemic. But most small- and medium-scale farms cannot afford such measures. The production in Vietnam has already transformed from small/medium-scale to large-scale in three years. After the outbreak, there has been a 50 to 70 per cent reduction in the number of small and medium farms, says Duy. At the same time, large ones increased by 160 per cent. "The large farms knew the epidemiology scenario of ASF. Small farms were very vulnerable," says Duy. In China, 40 million small-scale pig farmers were the hardest hit from ASF in 2019 as per a report by Grain, a Barcelona-based non-profit organisation.

"Even after ASF is dealt with, the pig population might not be the same as before, except in China because the government there is giving financial support to farm owners to produce good quality pigs and to put in place good biosecurity measures. Only a good biosecure farm can bring pig production back to normal," Partiwat Poolperm, a swine expert based in Thailand, tells DTE, In other countries, it is possible that backyard farms will not make a comeback.

Josef Schmidhuber, deputy director at FAO's Trade and Markets Division, says, "ASF has wiped out more meat production than any other animal disease in modern history." This is in specific reference to the global impact of the viral disease outbreak in China. The country had to cull 100 million pigs since 2018, and has lost

half of its pig population to ASF, as per official figures released by *South China Morning Post*. Such was its impact that food inflation reached 17 per cent in China in December 2019. It is reported that to meet the meat demand, China released from its "secret reserve of pork" (a reserve it created in 2007, whose size is a state secret) to the public. This was also to stabilise the price of pork, which had doubled in 2018-2019. As per the ADB report, China and neighbouring countries lost $55 billion to $130 billion due to ASF. To put this figure in context, the US pork industry contributed $40 billion to the country's GDP in 2020, as per the country's National Pork Producers Council.

LOOMING CHINA

China is the world's largest producer, consumer and importer of pork. It is also the largest importer of soybean which is used as feed. The mass culling of pigs in China has, therefore, not just disrupted the domestic (see 'Costly animal' *p*39) as well the global pork trade, it has also impacted the international market of animal feed.

Pork production has consistently risen in China. In 2010-2018, its annual pork production had risen by 50 million tonnes, as per OIE. In 2018, China was producing as much as 50 per cent of the world's total pork. But ASF caused a 25 per cent dip in global pork production (see 'Global fall' *p*39), as per *Global Pork Production Report 2014-2020* by *ResearchAndMarkets.com*

As the pig population dipped, China's total consumption of animal feeds, such as soy, dropped by 17 per cent in 2019. The country used to process over 80 per cent of imported soybeans into animal feed. As China's animal feed import fell, the global prices also dipped.

In the global market, this combination of fall in pork production and feed consumption in China proved a boon for many countries. Pig farmers outside Asia benefited from cheaper feed costs and higher export demand. The UK's food exports to China increased by 28 per cent in 2020, compared with the same period last year, as per the country's Department of Environment, Food and Rural Affairs.

With China being the world's largest producer, consumer and importer of pork as well as pig feed, global markets of these products have fluctuated with the fall and rise in the country's pig population

Since mid-2020 ASF infection has been declining in China, though it continues to spread in Europe and Asia. This led to a big announcement by China that it would start restocking the pig population to reach 90 per cent level of pre-ASF period by mid-2021. But in February 2021, the Harbin Veterinary Research Institute under the Chinese Academy of Sciences declared that the ASF virus had mutated. The new strain causes mild disease but is very difficult to detect. This fuelled fear that the infection would now be much more. In January, *Reuters,* quoting unnamed industry sources, reported about two new strains were bringing down production in pig farms.

A May 20, 2021, report by Meat and Livestock Australia (MLA), a service provider to Australia's red meat industry, says the new strain has already killed 8 million pigs this year. This could be the reason why Chinese pork imports have risen in 2021, leading to fresh realignment among exporters. "Chinese meat imports in the first three months of the year reached 2.56 million tonnes SWT [shipped weight], up 21 per cent from the same period last year," says the MLA report.

In April, 2021, due to heavy exports to China, pig prices in the EU increased by an average of 19 per cent, according to the UK's Agriculture and Horticulture Development Board. China is the third-largest market for the US' pork exports. According to estimates by HSBC, pork prices went up by 80 per cent, benefiting the American producers. The US also exports soybean to China whose price came down due to fall in demand.

Another development in China has added to this fast-changing animal protein and feed market. After the 2018 outbreak, the country undertook a massive reorganisation to change its pig farming from unorganised to consolidated industrial-scale. By 2025, under this plan, China would source 65 per cent of its pork from these large-scale farms. As per USDA,

which has a keen interest in China's pork industry for its export potential, China has operationalised 15,000 large-scale pig farms in 2020 alone. In addition, 13,000 large farms have been added to the production chain. USDA forecast says that with rapid consolidation of the pork industry in China, the large-scale pig farms will need more soybean feed.

China's agriculture ministry, in June 2021, reported a rise in pig numbers as it started restocking the depleting population. As per the ministry, the country's pig population is likely to exceed 440 million heads in 2021, in comparison to 310 million and 360 million heads in 2019 and 2020, respectively. China spent $19.35 billion importing soybean in the first five months of 2021, an increase of 44 per cent compared to its import spending during the same period last year. With it, the demand for soybeans has risen across the world. As per Chinese government data, soybean imports from the US and Brazil increased by 12.8 per cent in the first five months of 2021, in comparison with the same period last year.

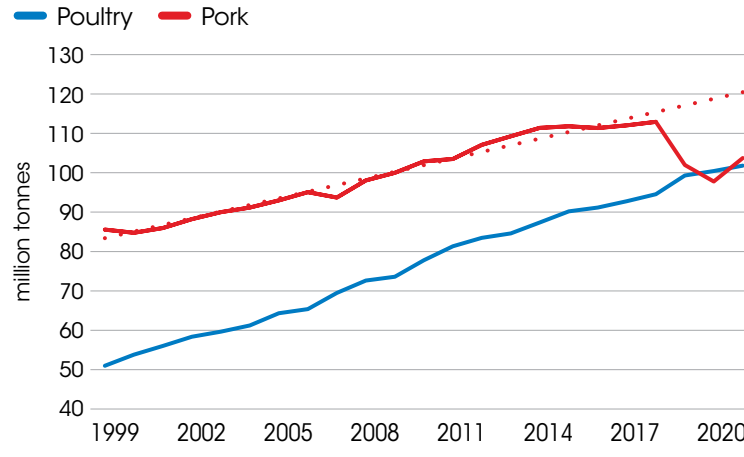
On the impact of this hike in feed price, Poolperm says: "In future, pig feed might play a big role for the small size farm holder because you cannot buy cheap ingredients for your farm. Also, there was a shortage of feed ingredients because in South America they got La Niña so there was a hit in production. In the pig meat production cycle, feed accounts for 70 per cent of costs. So if you increase your feed price, your total cost also increases." This will have a negative impact on the smallholder businesses as they would not be able to bear this high cost.

IMPACT IN INDIA

The outbreak of ASF, though reported last year in India, has already disturbed the domestic pork market and the supply chain. Piggery has been a traditional source of livelihood and nutrition for the majority of people in northeastern, eastern and southern states. In Nagaland, for instance, pig rearing is an important part

GLOBAL FALL

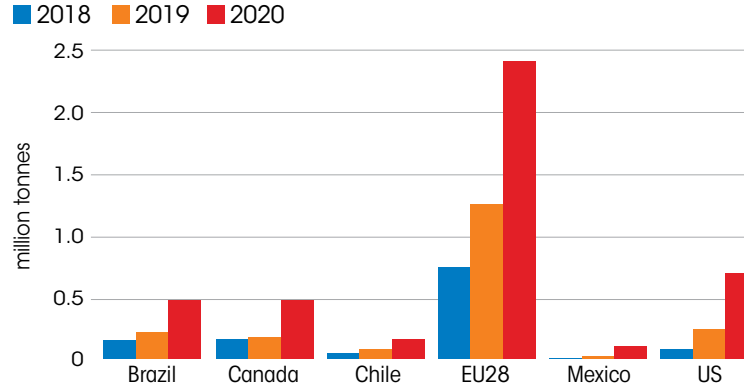
African swine fever has severely hit global pork output



Data: US Department of Agriculture, Production Supply and Distribution database

EUROPE'S GAIN

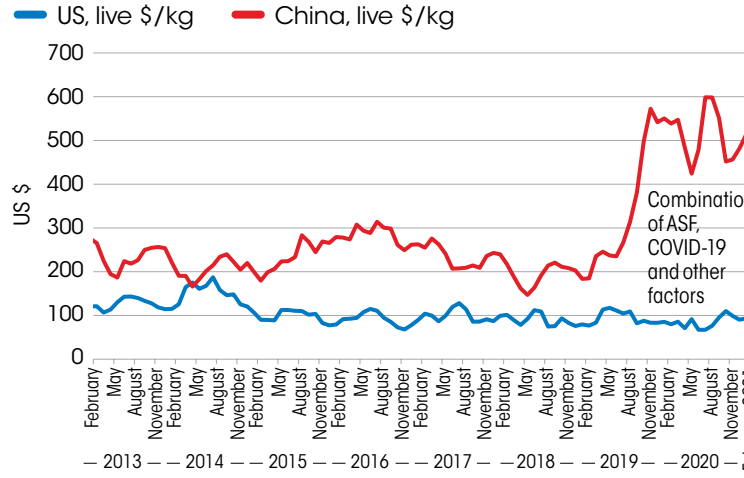
The EU has trebled its pig meat exports to China since 2018



Data: Text and Data Mining

COSTLY ANIMAL

Live pig prices up to 4 times higher in China than in the US



Data: USDA and MARA

Note: From "The impacts of African Swine Fever (ASF) on global meat and feed markets" by Josef Schmidhuber Deputy Director, Markets and Trade Division, FAO, Rome

of the culture and farming system of the Naga community. With pork being the most favoured source of protein, residents rear one or two pigs in the backyard for meeting any exigencies. So much is the demand for pork that Nagaland sources more than half of its requirement from other states. In recent years, the commercial piggeries of Uttar Pradesh, Rajasthan, Punjab, Rajasthan and Haryana have emerged as major suppliers to Nagaland and other northeastern states.

Estimates show that ASF has caused a 50 per cent shortage in northeastern states' pork production. The effect of ASF in the northeast is also being felt by the commercial pig farmers in the northern states. Dharminder Singh of Sanghera village in Barnala district set up his farm after graduating from Ludhiana's Guru Angad Dev Veterinary and Animal Sciences University and is among the 1,500-odd pig farmers in Punjab. He has seen his farm grow from 30 pigs in 2013 to 500 now. "We have been stopped from trading since the recent outbreak. The market price of live animals has dropped drastically while feed cost has doubled," he says. The price of soybean for feed is ₹68 per kg this year against ₹35 last year.

EUROPE SHAKEN, NOT STIRRED

Europe has benefited from the crisis in China (see 'Europe's gain', *p*39), but it has been shaken by the outbreak within its own territory. The Germany-Poland border areas have been reporting cases of ASF in wild boars. Authorities have detected nearly 5,000 infected animals since 2019, as per a combined country count on March 29, 2021, by multimedia website *Pig Progress* using OIE data. In March this year, agriculture ministers of Germany, Poland and the Czech Republic had an emergency meeting to tackle the fast spread of ASF in wild boars and agreed to allow their aggressive hunting. Germany is also fencing its border with Poland to stop movements of wild boars. Half of Germany's frozen pork used to be exported to China till last August when the latter stopped importing due to the ASF outbreak. Currently, Germany has been reporting an increase in pork export, mostly to the EU and the UK. But there is a threat of Germany facing a curb on its export of frozen pork to EU countries, which will, in turn, lead to further shortage in the continent.

ASF has hit the affordability of the primary source of animal protein world over. There could be a decline in calorie availability globally due to higher meat and animal feed price

Many have started speculating on the ASF outbreak's impacts on general animal protein consumption in the world. "When ASF first hit pig production, the impact was dramatic in two years because the pork prices were very high. To adapt with the change the farmers raised a lot of poultry, buffalo, and fish. About maximum 30 per cent protein intake was replaced by these items in Vietnam," says Do Tien Duy.

This may be a temporary development, but there is a perception that COVID-19 has brought the focus back on non-vegetarian food and the way we source it. Still, it is safe to say that ASF has caused long-term changes in the demand-supply chain in the pork industry that has a bearing on agricultural products as well.

Besides, it has hit the affordability of the primary source of animal protein. There would be a decline in calorie availability in all regions of the world due to higher prices of meat price and of cereals used as feed, as per *Modelling the global economic con-sequences of a major African swine fever outbreak in China,* published in *Nature Food* in April 2020. It says: "Aside from China, we see many countries in East and Southeast Asia as well as Europe with declines in calorie availability of more than 1 per cent. In high-income countries where baseline calorie availability is already high, such declines will tend not to have negative health impacts... The largest absolute change in hunger is found in India (more than 2 million additional people at risk of hunger) and is driven primarily by the secondary price impacts, particularly the increase in the price of wheat, which is an important food staple." DTE

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Himalaya Joins the Fight Against COVID-19














The onset of COVID-19 has changed life as we know it. We have adopted the “new normal” wherever we go – work, school, home. Now, more than ever, the pandemic has highlighted the importance of partnering and collaborating with the government, non-government organizations, foundations, research institutions, and civil society bodies to ensure maximum outreach at the community level.

The Himalaya Drug Company has been actively supporting India’s fight against the pandemic. Underlining the brand ethos, ‘Himalaya Cares’, and with the help of our implementing partners, the Company has helped over 6,40,000 beneficiaries by providing hygiene and essential health products across different communities and locations. Powered by the vision to bring wellness and joy to every home through their herbal solutions, Himalaya has reached out to various sectors, including NGOs, schools, hospitals, BBMP workers, slum dwellers, doctors and chemists, transgender communities, construction workers, cancer patients, refugees, tribal, migrants, senior citizens, and many religious institutions.

In addition to this, we continue to extend our support to the longstanding partnerships while reshaping the methods of engagement. We have helped students continue their education at home by distributing tablets, online capacity building, and finding employment for PWDs, afforestation drives, and fostering sustainable communities in rural areas.

While we hope the current situation improves soon, we will continue to explore the potential of aligning our social goals with the ethos of our organization – “Wellness in every Home and Happiness in every Heart”.

Tech transfer is the new mantra

A tech transfer hub for mRNA vaccines is being set up in South Africa, a first for the continent; but will the pharmaceutical companies play ball?

PRESS RELEASES can sometimes provide valuable pointers to which way the wind is blowing. On June 24, the World Health Organization (WHO) issued a press note on a tripartite meeting it had attended nine days earlier with the World Trade Organisation (WTO) and the World Intellectual Property Organisation (WIPO). It was purportedly a meeting to "map out further collaboration to tackle the COVID-19 pandemic"; but going by the outcome, it appeared no different from the many meetings that have been held over the years to promote access to medicines, vaccine equity and the like.

Two specific initiatives were announced to address "the pressing global challenges at the intersection of public health, intellectual property and trade". First, the three agencies will collaborate on capacity-building workshops to enhance the flow of up-to-date information on the pandemic and ways to achieve equitable access to COVID-19 health technologies. The first of these workshops will enable policy-makers in member-countries to understand how intellectual property (IP), know-how and technology transfers work in relation to medical technologies. It will be held on September 19, months after the pandemic has already left a trail of 3.9 million deaths (as on June 25).



The patronising objective of these workshops is reflective of the inequitable global health system in which the public health concerns of developing countries have been held to ransom by the commercial interests of the big trading nations and blocs. One cannot cavil at the similarity of goals of WTO and WIPO; they strengthened their complementarity by signing a cooperation agreement in 1995. WHO was brought on board much later, but for over a decade now, the three organisations have been periodically holding workshops and conferences to address the glaring inequities of the public health system. In 2015 they held a trilateral symposium on public health, IP, TRIPS (WTO Agreement on Trade-Related Aspects of Intellectual Property Rights) and access to medicines. It was all about learning from the past to illuminate the future. That clearly hasn't happened, as the second announced initiative of the organisations reveals.

They plan to set up a joint platform to provide tripartite technical assistance as "a one-stop

shop that will make available the full range of expertise on access, IP and trade matters". The operative part of the joint statement makes it clear that no major breakthroughs can be expected, since the assistance is geared at telling poor nations how to make "full use of available options" to access vaccines, medicines and technologies. In short, business as usual with no developments in the offing, such as a waiver of IP rights through suspension of TRIPS that over a 100 developing countries have sought at WTO.

To hold capacity-building workshops at this juncture and to talk of technology transfers is characteristic of a system that has failed to respond adequately to health emergencies in which low-income countries are left without access to life-saving medicines. It happened during the HIV-AIDS epidemic and during the earlier flu epidemics. The situation now is dire. While rich countries have been able to vaccinate sizeable sections of their population—as high as 60 per cent in some cases—poor nations are yet to get access to vaccines and treatments to battle the deadly SARS-CoV-2 virus. The WHO dashboard on June 25 listed the reported cases of COVID-19 at 179.24 million, as a third wave of the pandemic began to engulf the poorer nations, especially those in Africa where cases and deaths shot up by almost 40 per cent in the third week of June.

Low-income countries cannot rely on vaccine-producing nations to supply their needs. The solution is to have manufacturing units in different parts of the world

One of the major causes, as WHO chief Tedros Adhanom Ghebreyesus emphasises, is the inequitable access to vaccines; in a crisis, low-income countries cannot rely on vaccine-producing nations to supply their needs. The solution obviously is to have manufacturing units in different regions of the world, more so in Africa, which has few facilities. That's the why the proposal to set to up a technology transfer hub in South Africa comes as a bit of cheer. Announced on June 21 by WHO, the hub for COVID mRNA vaccine technology will be the first such undertaking anywhere, and could be the precursor to similar facilities in other poorly served regions. Vietnam could be the next hub to serve the Southeast Asian region, if the applicant company can provide large-scale manufacturing.

What exactly is a tech transfer hub? It is a training centre where technology is imparted for industrial-scale production along with clinical development practices. Interested manufacturers from low- and middle-income countries will be provided training, production know-how and necessary licenses to use the technology. It is the first tangible international effort to diversify vaccine production to regions desperately in need of it. The idea has the backing of French President Emmanuel Macron, who says France is committed to helping Africa scale up its local manufacturing capacity of COVID-19 vaccines and therapies. Macron promises more such initiatives.

Supported by WHO and its COVAX group—comprising GAVI, the Vaccine Alliance; the Coalition for Epidemic Preparedness Innovations (CEPI); and UNICEF—that aims to provide fair and equitable access to COVID-19 vaccines for every country, the tech transfer hub could be a game changer if firms like Pfizer-BioNTech and Moderna, leading producers of mRNA vaccines, come on board.

WHO is in talks with these pharma giants to share their technology and is hopeful of vaccine production commencing in a year's time. That remains a big if. SA sees it as a landmark initiative that could put Africa on the path to self-reliance and change the narrative of an Africa as a centre of disease and poor development to a positive one. The India-SA proposal at WTO for TRIPS waiver seems to be going nowhere, since there appears to be a tacit understanding among the developed nations to work on the flexibilities permitted by the agreement rather than allow a full-scale waiver. Tech transfer hubs appear to be part of the sops they are offering.

Much hinges on what the vaccine companies decide. Or else, for Africa this could be a case of being all dressed up but nowhere to go. DTE

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Palette

WHAT'S INSIDE

Beat summer heat with Tamil Nadu's healthy drink, *koozh* **P46** / Researchers say service sector can help alleviate poverty **P48** / *Sherni* shines a light on India's forestry and wildlife issues **P52**

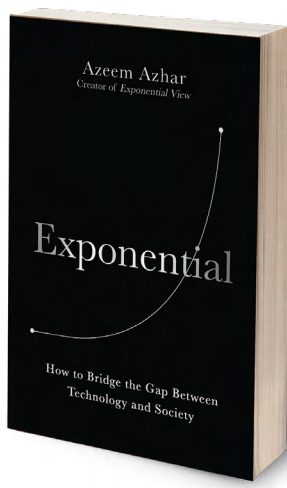
RECOMMENDATIONS

DOCUMENTARY

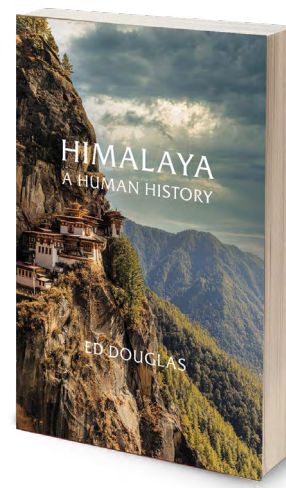


The internet has been circulating for years the story of "52", the world's loneliest whale—it calls at a frequency of 52 hertz, higher than what any other whale species is able to understand. As a result, 52 has spent its entire life in solitude. *The Loneliest Whale: The Search for 52*, a new documentary from US film company Bleecker Street and executive producers Leonardo DiCaprio and Adrien Grenier, follows scientists as they attempt to find 52 and explore the lessons its lonely plight can teach us. *The Loneliest Whale* will premiere in select US theatres on July 9.

BOOKS



This is the first era in the Earth's history when technology is accelerating at speeds that humans simply cannot match. As a result, there is an "exponential gap" between new technology and humankind. It explains why countries are unable to battle cyber warfare and leaders show inadequacy in dealing with public issues, says writer and technologist Azeem Azhar. In *Exponential: How to Bridge the Gap Between Technology and Society,* Azhar explains ways to harness fast-moving technology to build a better world.



The world's highest mountains are also a cornucopia of cultures, adventures and revolutions. The Himalayan range is where Jesuit missionaries and Tibetan Lamas shared technologies; where Nepali craftsmen came to work for the Mongolian Khans; and where Armenian merchants traded musk and gold with the Mughals. The mountains are bursting with extraordinary stories of its peoples, which writer and reporter Ed Douglas attempts to reveal in *Himalaya: A Human History.*

COOL OFF WITH KOOZH

FROM ROADSIDE VENDORS TO HOTELS, THIS NUTRITIOUS BEVERAGE AND PORRIDGE MADE OF LOCAL MILLETS IS A COMMON SIGHT IN TAMIL NADU DURING SUMMERS

VIBHA VARSHNEY

COME SUMMER, you will find *koozh* everywhere in Tamil Nadu. The beverage prepared from locally available millets is as versatile as it is popular: it is available as a drink or a porridge; hot or cold; at home or on the streets; with or without fermentation; made from a single millet variety or from a mix of them. There are also dozens of savoury and tangy accompaniments to choose from, both vegetarian and non-vegetarian.

The fermented beverage is so ingrained in the popular culture that *koozh* drinking challenges are common on social media platforms. Although just a glass or bowl of *koozh* is enough to fill one's stomach, young and old online enthusiasts guzzle as much as 8 litres in just a few minutes.

In Tamil Nadu towns, it is one of the cheapest foods available, making it a staple for informal workers, travellers, labourers, truck drivers and domestic workers.



Koozh has many variations; it can be served as either a drink or a porridge

Koozh preparation is a small-scale business in the state. Vendors make it in large batches at home and simply dilute it with water and buttermilk before serving with accompaniments, such as onions, coriander, mango chutney, lime, chilli, turkey berry, fried guar beans, fried *papad*, fish, crab, eggs and chicken, to name a few. The drink has transcended the class barrier and is also sold in niche restaurants selling healthy foods and in high-end hotels. However, what you can get for ₹10 on the road might be ₹500 at a hotel. Nonetheless, as the fermentation process takes a day, finding a ready source when you crave *koozh* is welcome. Regular consumers swear that the product sold in the market is much tastier than the one that they make at home.

However, the use of contaminated water in *koozh* by vendors is a cause for concern. In 2010, advocacy group M S Swaminathan Research Foundation recommended to the state government that the sellers be provided with clean water and trained in best practices on food handling.

Unfermented *koozh* is served in the temples of goddesses Meenakshi and Sakthi during *Aadi* (*Aashadha*), the fourth month of the Tamil calendar that occurs from mid-July to mid-August. This month is deemed auspicious to conduct religious activities but inauspicious for new ventures such as weddings or buying property. The sweet porridge, prepared with millet flour, black gram, green gram and jaggery, is first offered to the goddesses and then distributed as *prasadam*.

While *ragi* (finger millet or *Eleusine coracana*) is the most common millet used for *koozh*, *bajra*/*kambu* (pearl millet or *Pennisetum glaucum*) is equally popular. These millets grow easily in warm and dry regions such as the drought-prone south Indian states and are available at low prices. This makes *koozh* both popular and affordable. *Kambu koozh* is slightly more expensive than *ragi*. The former is mentioned in Sangam literature, the earliest writings in Tamil, as a healthy traditional breakfast or lunch. Some people also consume *koozh* with the belief that it helps reduce the ill-effects of alcohol.

Millets have seen a rise in popularity in recent years. They are rich in fiber, high in iron, calcium, vitamin B-complex and other essential nutrients. As a result, they are considered perfect to control diabetes, one of India's most prevalent non-communicable diseases. As a prebiotic, they are good for the stomach.

Fermented millets are more nutritious, as beneficial microbes such as *Lactobacillus fermentum*, *Weissella paramesenteroides* and yeasts break down the starch into sugars and amino acids. Fermentation also reduces the inhibitors of the enzymes trypsin and amylase and make the final product easier to digest, suggests a study published in the journal *Probiotics and Antimicrobial Proteins* in October 2010. The final pH of *koozh* ranges from 4.3 to 4.9, resulting in a tangy drink with an increased shelf life, as indicated in an article in the 2020 book *Ethnic Fermented Foods and Beverages of India: Science History and Culture*. *Koozh* is sometimes prepared through double fermentation, especially in colder climates.

In Andhra Pradesh and Telangana, there is a similar beverage to *koozh,* called *ambali*, which is prepared from *ragi* flour. Salome Yesudas, a food and nutrition expert in Telangana who works with indigenous communities, shares her recipe for the fermented drink with *Down To Earth* (see recipes). For this, the water from cooked rice, called *ganji*, is fermented overnight and used to cook *ragi* flour. It is as mouth-watering and nutritious as *koozh*. DTE @vibhavarshney

RECIPES

1 KAMBU KOOZH/ PORRIDGE

INGREDIENTS

Bajra (coarsely ground): 100 g
Buttermilk: 1 cup
Salt: To taste
Water: As needed to cook and dilute the porridge
Accompaniments: Chopped onion, green chilli and raw mango

METHOD

Soak the coarsely ground *bajra* in two cups of water for two to three hours. In a thick bottom pan, heat two more cups of water. Slowly add the soaked *bajra* and salt and cook till the grain is soft. Add more water if needed. Cool the cooked *bajra* and then add water to get a porridge-like consistency. Cover the pan and keep it overnight. In the morning, mix well and add buttermilk. Add the onion, chilli and mango and mix again, and the *koozh* is ready to eat.

2 RAGI AMBALI/ BEVERAGE

INGREDIENTS

Ragi: 100 g
Fermented water from cooked rice (*ganji*): As needed
Salt: To taste

METHOD

Mix the *ragi* flour well with a small quantity of day-old *ganji*. Ensure that there are no lumps. In a thick bottom pan, heat more *ganji* and slowly add the *ragi* mix to it. Add salt and cook well till it is thick. Cool it and add more *ganji* if needed. Enjoy it with your favourite accompaniment.

PHOTOGRAPH: VIBHA VARSHNEY / CSE

UNLEASH GROWTH

PAST TRENDS OF POVERTY ALLEVIATION IN INDIA SHOW PROMOTION OF THE SERVICE SECTOR CAN POTENTIALLY LIFT MILLIONS OUT OF POVERTY

SWAPNIL SONI AND **RAMAKRISHNA MAJUMDER**

PANDEMIC-INDUCED lockdowns in 2020 and 2021 have pushed millions into poverty. While India has not counted its poor since 2011, an estimate by the World Bank's Development Data Group in May last year said that COVID-19 could result in 12 million Indians becoming poor. Another study by the Azim Premji University, Bengaluru, estimates that the first wave of the pandemic could have pushed 150 million people into impoverishment. In order to help formulate future plans to curb this surge, we analysed past trends to determine which factors have played a major role in poverty alleviation in the country. Historically, rural India has seen a higher poverty ratio (26 per cent) than urban areas (14 per cent). That said, our analysis threw expected results—the key to India's poverty alleviation lies in employment generation in rural areas.

Further, we learnt that rather than agriculture—the primary productive sector of the economy and a major occupation in rural areas—focus should be directed towards unlocking the industry and services sectors. In particular, we



ILLUSTRATION: RITIKA BOHRA / CSE

have observed that areas where services such as hospitality industry registered a growth also saw a rise in poverty alleviation.

SEEDS OF PROGRESS

In the absence of any latest data, we based our analysis of state-wise poverty rates on the Reserve Bank of India's *Handbook of Statistics on Indian State*. We compared the latest data, available for 2011-12, with that of 2004-05. Our findings show that the country managed to reduce its poverty rate from 37 per cent in 2004-05 to 22 per cent in 2011-12. However, the alleviation rate was skewed among states. Of the 23 states considered, Goa, Andhra Pradesh, Himachal Pradesh, Tripura and Uttarakhand saw alleviation rates of over 65 per cent; while Assam, Jharkhand and Chhattisgarh recorded less than 20 per cent reduction. (Other than the Union Territories, we left out five states—Arunachal Pradesh, Manipur, Mizoram, Nagaland, Sikkim—from our analysis due to paucity of data and because of their miniscule contribution to the country's gross domestic product or GDP at 0.71 per cent).

We examined rural and urban regions separately while analysing poverty reduction through the lens of unemployment rates. This revealed an interesting pattern: poverty reduction has a significant negative correlation with growth in rural unemployment, but not with urban unemployment. This implies that states with lower levels of rural unemployment (Goa, Himachal Pradesh, Tripura, Kerala and Punjab) excelled in poverty reduction (see 'Inverse relation').

However, there are exceptions: Bihar, for instance, managed some reduction in poverty despite a drastic rise in rural unemployment. Uttarakhand, Andhra Pradesh and Tamil Nadu too saw high poverty alleviation despite a growth in rural unemployment. Madhya Pradesh could not reduce poverty despite low rural unemployment.

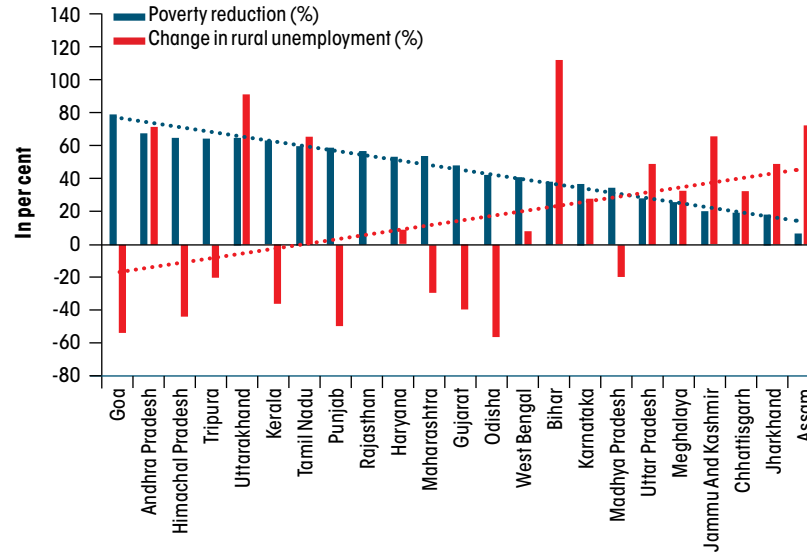
While in Bihar, the poverty reduction is largely due to the change in wage rates during the period considered, Uttarakhand saw the highest industrial growth rate and the second-highest fixed capital formation and service sector growth rates among all 23 states between 2004 and 2011. Similarly, Tamil Nadu registered the fourth-highest growth in services. Andhra Pradesh exhibited the fifth-highest fixed capital investment growth rate. These point to massive industrialisation and tertiarisation in these states, which fostered job creation, income generation and poverty alleviation.

Madhya Pradesh lagged in industrialisation and tertiarisation, and so rural employment could not suffice for poverty reduction.

These findings underscore the role that industry and services sector play in a state's poverty alleviation efforts. Poor promotion of these sectors in rural areas has led to mass migration of workers to towns and cities for employment. But this trend may not be sustainable in the long run. It deters the fundamental fabrics of socio-cultural structures due to the displacement of people. It may also inflate issues that harm the social welfare and security of workers in a foreign region.

INVERSE RELATION

States that managed to lower rural unemployment between 2004-05 and 2011-12 saw higher levels of poverty alleviation



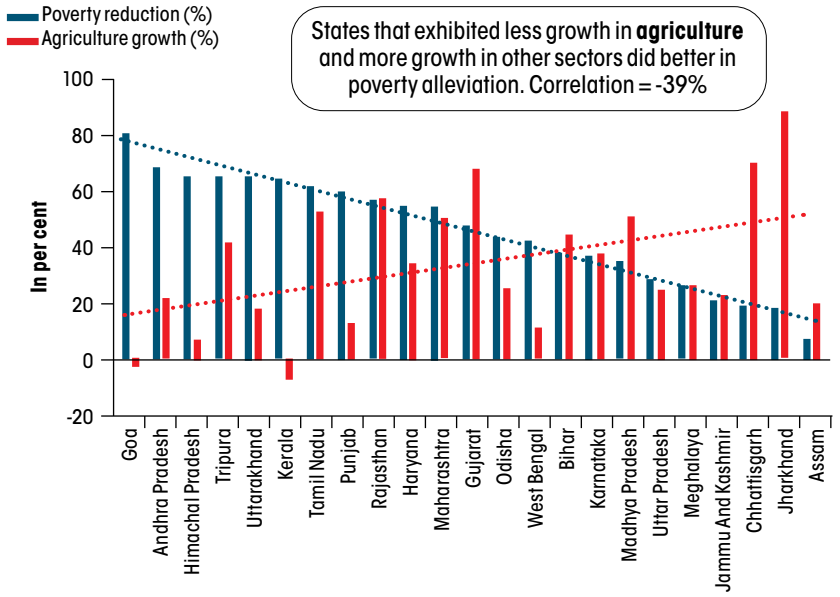
Source: Handbook of Indian Statistics (2004-05 and 2011-12); authors' own calculations

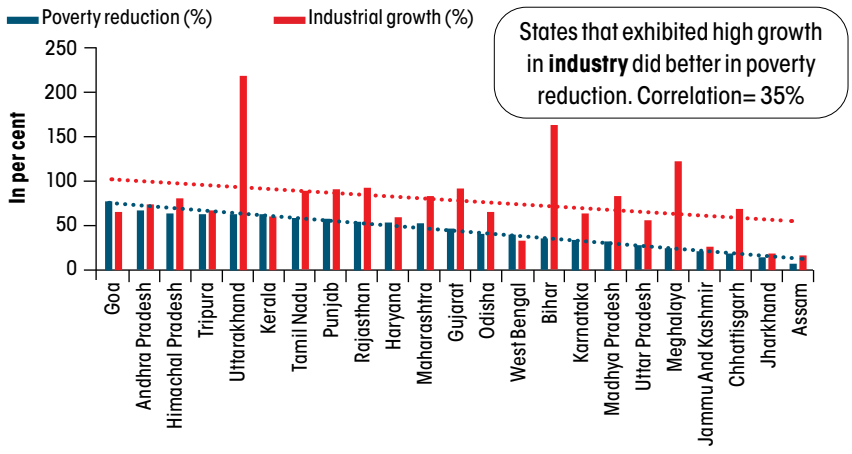
SERVICES TRUMP ALL

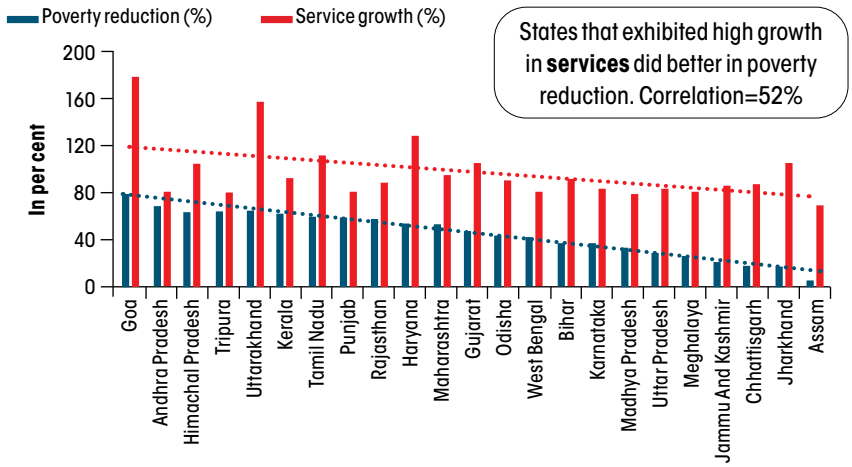
Comparisons of poverty alleviation against the growth rates of all three productive sectors revealed statistically significant correlation rates, with varying magnitude (see 'Ways to cut poverty', *p*50).

The correlation between poverty reduction and agriculture growth is -0.39 per cent. This indicates that growth in agriculture is not sufficient for poverty reduction. The states with higher growth in agriculture (Jharkhand and Chhattisgarh) exhibited the lowest gain in poverty reduction. Notably,

WAYS TO CUT POVERTY







Source: Handbook of Indian Statistics (2004-05 and 2011-12); authors' own calculations

they showed poor growth in the other sectors. In contrast, the states with lowest growth in agriculture but highest growth in industry and services (Goa, Andhra Pradesh, Himachal Pradesh) outperformed others in poverty alleviation. While industrial growth helped in 35 per cent poverty reduction, the figure is 52 per cent for the services sector. This echoes the theory of economic growth and structural change postulated by Nobel laureate and American economist Simon Kuznets in 1955, which says a developing economy shifts from agriculture to industry and then to services; a process of "structural change". However, industrialisation if promoted in rural areas is less likely to make much of a difference. Higher fixed capital investment in industries has made them capital intensive rather than labour-focused. Such disproportionate growth in employment and output will only lead to "jobless growth". Services, being more productive and labour-intensive, guarantee a higher level of income and hence facilitate poverty eradication. Promotion of this sector calls for infrastructure development in rural areas—a tall order. Yet, a political will and long-term strategies could pave the way for such a boost. The current wave of privatisation and production linked incentive schemes must include rural areas. Special incentives like tax benefits can be provided to firms for setting up infrastructure in rural areas with reservations for local employment. Skill development is equally important to enable the rural population join the workforce in higher productive sectors. DTE

@down2earthindia

(Swapnil Soni is senior research scholar, Indian Institute of Science, Bengaluru, and Ramakrishna Majumder is an independent researcher, Bengaluru)



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Building Wise

How do we design for resource efficiency and sufficiency in a built environment? How can we practice what we preach build and live sustainably? We had a compelling reason to ask these questions, having just begun building our own environmental training institute, in the foothills of the rugged Aravalli ranges in the Alwar district of Rajasthan, India.

It offered us an immense opportunity to learn constantly, to test our knowledge, and to demonstrate processes such as how to prevent water from flowing away and reduce its use and abuse; how to recycle and reuse waste; reduce energy footprint; and enrich local vegetation while maintaining a healthy ambience and wellbeing.

It became necessary for us to look around and see what was taking shape and how, and engage with practising architects, planners and designers to understand their experiments and approaches in different genres of buildings – homes, offices, educational institutions, houses of the poor, community buildings, and habitat planning for micro-management of resources.

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Got the basics right

SHERNI DIVES DEEP INTO HOW FORESTRY WORKS IN INDIA, HIGHLIGHTING SEVERAL ENVIRONMENTAL ISSUES ON THE WAY

RAJAT GHAI



Sherni

Cast: Vidya Balan, Vijay Raaz, Brijendra Kala, Neeraj Kabi, Mukul Chadda, Sharat Saxena

Direction: Amit V Masurkar

Streaming on Amazon Prime since June 18

IF I were to sum up this review in one sentence, I would say *Sherni* is one of the few films that get the basics of environmentalism right. Despite its unassuming appearance, the film offers a layered take on complex environmental issues without getting preachy or going overboard.

Directed by Amit Masurkar of *Sulemani Keeda* (2013) and *Newton* (2017) fame, *Sherni* is set against the backdrop of a forest village. It follows forest officer Vidya Vincent (Vidya Balan in a brilliantly restrained but combative role) as she leads the search for a tigress that has wrecked havoc among the local people. The story by Aastha Tiku is inspired by the hunt for Avni or T1, a tigress that reportedly killed 13 people in 2016-18 in the Pandharkwada-Ralegaon forests of Maharashtra's Yavatmal district. She was shot dead by Hyderabad

PHOTO COURTESY: AMAZON PRIME VIDEO



royal and hunter Nawab Shafath Ali Khan and his son Asghar in 2018 (Asghar has now sent a legal notice to the movie producers who have said the film is a work of fiction). Avni had two cubs; one of them, a female, was rescued by junior forest officer Sidam Pramila Istari (reportedly the inspiration for Balan's character). The other, a male, has still not been found. Avni's death led to protests by activists and a case is going on in the Supreme Court where the activists claim the tigress was not a "man-eater".

For someone who grew up watching films like Dharamendra-Asha Parekh's *Shikar* (1968) and Shashi Kapoor-Rakhee's *Jaanwar Aur Insaan* (1972)—which greatly dramatise humans' relationship with forests and wildlife—*Sherni* provides a nuanced take on environmental matters through events and situations. For instance, when forest officials ask the village people why the victim of a tigress attack had taken his flock of goats to graze in the forest, they say he had no option but to do so as the common grazing land was taken over by the forest department for teak plantation. The incident encapsulates issues of human-wildlife conflict; rights of forest dwellers; loss of wildlife habitats and corridors; and poorly thought-out afforestation schemes or mining projects in forest areas.

The movie gives a glimpse of the forest bureaucracy of old India when one of Vidya Vincent's peers tells her: "India's forest department is a gift of the British. We officials should work like them. Bring in revenue and get a promotion." It also shows that though such attitudes have not changed, the science of forestry has evolved with the times. People in the remotest of areas have mobile phones. Forest guards use camera traps to track tigers and identify them through DNA samples along with pug marks.

Sherni also puts the spotlight on unsung forest personnel, especially women. Balan's character is humiliated because of her gender; her supervisor overrules her in front of other men; she is taunted for being sent as a "scapegoat" in a crisis situation and brushed aside. At home, she is told by her mother-in-law to wear more gold and by her mother to have a child. Balan soldiers on through all of it, composed but still combative.

Balan is supported by renowned cinema veterans Sharat Saxena, who plays a hunter; Vijay Raaz, a mild-mannered man of science; Ila Arun, Balan's mother-in-law; and Brijendra Kala, as the corrupt and ignorant head of the forest department.

The performances are finely etched. While Kala takes the cake, Raaz is his bankable self and Saxena is almost convincing as he repeatedly tells you: "I can look into a tiger's eyes and tell whether it is a man-eater."

The best aspect of the movie is its production design. Each setup is designed to the minutest of details. For instance, the forest department office is a typical, paper-filled "provincial backwater" setting with a room full of archived files covered in cobwebs and dust. The white-washed cabin of the boss has a glass-covered tabletop, taxidermied animals and a huge portrait of a tiger. It instantly reminds you of a government office. Rakesh Haridas's camerawork, too, matches the accelerating pace of the background score.

One aspect where it could have improved is the slow-paced first half, which makes it stretched. But the climax and epilogue of the film take you aback. They show that the more India tries to change, the more things remain the same. One only hopes that *Sherni* serves as a clarion call to forest administrators to clean up their act, sooner rather than later. This "mainstream" movie does well in dealing with a somewhat niche theme DTE @down2earthindia

THE CLIMAX AND EPILOGUE OF *SHERNI* TAKE YOU ABACK. THEY SHOW THAT THE MORE INDIA TRIES TO CHANGE, THE MORE THINGS REMAIN THE SAME. ONE ONLY HOPES THE FILM SERVES AS A CLARION CALL TO FOREST ADMINISTRATORS TO CLEAN UP THEIR ACT

NOMADLAND

A pastoral, nomadic community in the Saurashtra region of Gujarat, the Bharwads trace their lineage to the cowherd playmates of lord Krishna. The community owns large herds of indigenous Panchali sheep, Kamini goats and the endangered Halari donkeys, and spends most of its time scouting for grasslands on the southern edge of the Little Rann of Kutch. Its lifestyle in the past few decades, however, has altered in major ways due to the changing climate. Some researchers estimate that the average seasonal rainfall in this otherwise arid region has doubled in the past three decades, with heavy rainfall events and cyclones becoming more frequent. This has led to an increase in farmland and forest area, at the cost of grasslands, the Bharwads say. The village councils, too, have widely planted *vilayati babul* (*Prosopis juliflora*) trees on fallow land, further invading the grazing lands. With dwindling income, the younger generation no longer wants to pursue the nomadic life and is opting to settle down. This has also led to a dramatic decline in the number of Halari donkeys. A photo essay by

RITAYAN MUKHERJEE



Last remnants

With a lush white coat and muscular build, the Halari donkey can be easily mistaken for a small horse. This distinct breed of donkeys, native to the Saurashtra region of Gujarat, is primarily reared by the nomadic Bharwad community that uses the animal for pulling carts or transporting goods during migrations. Chanabhai Rudabhai Bharwad (right) of Dhoraji village in Rajkot district says the milk of Halari donkeys is considered to have medicinal value. There have been a few instances where some in the community have sold a litre for ₹2,000-7,000. However, there is no regular market for its milk.



Weave a cup

The Bharwads are known for their unique lifestyle, weaving patterns and food habits. They are particularly fond of drinking tea in cups made of banyan leaves.



Life sans roof

The community also lives in the open, without any shed. Dinner is usually *roti* and goat milk, says Hamir Haja Bhudiya, as he settles down with his family for the last meal of the day. Selling goat milk and sheep wool are their primary sources of income; Halari donkeys generate little revenue for them.



Shrinking world

Maintaining Halari donkeys has become difficult for Bharwads in recent years in the face of declining income from goats and sheep, and shrinking grassland. With increasing rainfall, the invasive *Prosopis juliflora (vilayati babul)* has grown out of control. More and more land is also under cultivation now. While some in the community manage to get permission from farmers to graze their animals on the stubble after crops like cotton are harvested, the others have to travel long distances in search of grazing land. Many a time, during excess rainfall and cyclones, goats and sheep fail to walk, fracture their legs or succumb to illnesses.

Dwindling herds

In recent years, there has been a dramatic decline in the number of Halari donkeys, with only about 600 left across Saurashtra. The number of Halari breeders has also reduced, with many Bharwads now selling off their herds to those looking for sturdy draught animals. Ranabhai Govindbhai says he owned a large herd a decade ago, but had to sell most of the animals due to unavailability of grazing grounds. Today, he only owns a handful of them.



Regimes' nightmare

ON JUNE 19, there were massive protests in all of Brazil's 22 states and its capital Brasilia. That day, the total deaths from COVID-19 in the country had crossed the figure of 0.5 million, the second highest after the US. Protesters termed President Jair Bolsonaro's government "genocidal". A placard at a protest in Brasilia read: "Half a million reasons to oust Bolsonaro." People belonging to all hues of the ideological spectrum participated, turning the protests into one of the largest against pandemic (mis)management by a government. Similar protests were also held in many states on May 29. Earlier, in March, many European countries, including Germany, saw similar movements.

Protests have re-emerged globally after a temporary lull in the early months of 2020, coinciding with the COVID-19 outbreak and lockdowns. 2019 was labelled the "year of protests". The tempo continued till March 2020, when COVID-19 struck, but subsided when nations imposed lockdowns. But within a few months, protests erupted again in numbers higher than witnessed in 2019.

This year, too, the first four months have seen a deluge of protests across the world. What makes this resurgence different is its character: the protests now are against COVID-19 mismanagement, which shows how the world has faltered in its response to the century's biggest crisis. It could also indicate that people have become impatient with the lingering lockdowns. The Armed Conflict Location & Event Data Project (ACLED), a US-based non-profit that analyses political violence and protests, says in a recent report: "The combined result is that demonstrations actually increased in 2020 relative to the year prior, not just despite—but in part because of—the pandemic."

The pandemic has influenced conflict/protest scenarios in the world in two ways. First, its mismanagement has become the rallying point for people to act against their governments. Second, the effects of the pandemic have accentuated the movements that predate the disease; for instance, the economic impacts of COVID-19 have increased global inequality. On the other hand, countries and groups involved in conflicts have used the pandemic to crush opponents in what is reported as political violence.

In India, we have witnessed large-scale protests by farmers, health workers, tribal communities, students, political parties and activists for a plethora of rights. In the last three months, the high courts and the Supreme Court have been occupied with either petitions on government responses to the pandemic or its enforcement of stringent laws—including terrorism provisions—against journalists, students and activists raising questions on various issues, including COVID-19. The ACLED study, too, says political violence in India has increased. From the beginning of the COVID-19 outbreak to April 2021, India reported 200 pandemic-related events, most of which involve political violence, it says.

COVID-19 has led to protests by people and political violence by governments; even changes in regimes

The pandemic has caused many socio-economic and political fault lines to resurface in not only global governance but also within countries. In India, judicial intervention to bring free vaccination "within the fundamental right to life" shows how the pandemic can impact the polity. We have already seen the ouster of many governments by popular vote, primarily due to COVID-19 mismanagement. Such governments anyway had devilish track records with regard to defending citizens' rights and democratic values. The pandemic just made citizens' grievances more pronounced. The crisis may become a cause for political devastation. DTE

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Installation of Continuous Emission Monitoring System (CEMS) and Continuous Effluent Quality Monitoring System (CEQMS) were mandated by Central Pollution Control Board (CPCB) in 17 categories of highly polluting industries (classified under highly polluting industries) and for common pollution treatment facilities. The purpose of mandating real-time monitoring is to strengthen the monitoring and compliance mechanism in the industries and also to promote the measurement of real-time data, which is to become the basis for regulators to check compliance by the industries in near future. In addition to this, these systems can also help industrial sectors/regulators in process optimization and taking timely corrective measures. Since CEMS and CEQMS are complex and expensive technologies, there are significant challenges and risks associated with their implementation. Therefore, appropriate knowledge and skill development for CEMS and CEQMS becomes most crucial factor for industries, regulators and other stakeholders.

Furthermore, in order to ensure proper implementation, auditing of these real-time technologies is an essential factor in improving the systems already installed in the industries. So this programme will also lay focus on audit methodology, which ensures correct implementation of the real time monitoring of emissions and effluent in an industry, to check whether stated standards and other regulatory requirements are being followed, status of facility's compliance, certification, verification, accreditation of the system, technical acceptance through calibration, quality assurance, generating accurate, reliable and traceable data and other related aspects.

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- Gaseous CEMS Technologies and its suitability and limitations.
- CEQMS Technologies and its suitability and limitations.
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- Data acquisition, handling and reporting.
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