BREAKING DOWN EIA

The draft Environment Impact Assessment Notification, 2020, will further dilute scrutiny over projects impacting the environment.

The Panama disease is destroying banana plantations. Forgotten varieties may hold the key.

Economic interests hasten development of COVID-19 vaccines, notwithstanding their efficacy.
ONLINE COURSE ON
SAFE WATER,
SANITATION AND
HEALTH FOR ALL
DURING AND POST
COVID-19

Course Dates
28 October -
30 November, 2020
Last Date to apply
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Total Study Hours
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(5 hours per week)

The provision of safe water, sanitation and hygienic conditions is essential to protect human health during all infectious disease outbreaks, including the COVID-19. To address this, water and sanitation safety planning plays a vital role, being a risk based management tools highlighting the integration of the health sector and helps to bring a human health perspective to traditional non-health sectors like water services and sanitation engineering.

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Hybrid-work model in the new-normal

THE COVID-19 lockdown has led to disruptions on a scale we have never seen before. It is not clear what the new-normal of our lives will be. For most of us working in offices, remote work should have been a welcome respite; a chance to improve our work-life balance. But many of us are finding that even with increase in productivity, we are losing the ability to differentiate between work and rest of life — there is fatigue and burnout — in this strange remote world. Also, we are learning that productivity — doing things on time and on schedule — is not the only measure to value our work. In fact, it is collaboration and teamwork that brings us fulfillment and improves the quality of our “work”.

So, many of us are looking at a hybrid-model of work in this new-normal. One that builds on the best of this remote technology-world that allows us not to commute long distance every day, but also one that encourages and builds more, not less, interaction between people.

But this new-hybrid normal — and this should bother us — will sharpen inequality in workplaces, and it will lead to more joblessness in the formal sectors of the economy. The fact is that working from home assumes that there is adequate space — physical and recreational. We discuss the digital divide, but this new-normal should make us discuss the living divide as well. It also means that our workplace will shed many non-essential costs — from support functions to rentals.

All this contraction and re-engineering will be good, and bad. More efficiency at the workplace; reduction in commercial building spaces that take up valuable green spaces; less traffic that reduces congestion and pollution; and, of course, reduced consumption that will be good for the planet and our livability index. Bad, because it will mean that people will be out of jobs — the economy as we know it only knows how to produce as cheaply as possible and to consume as fast as possible. We are beings of the marketplace.

So, what can we do differently? There is, of course, the prospect — and a very real one — that nothing will change post-lockdown. Once the vaccine hits the market, we humans will go back to all our old habits. In fact, governments will do everything to “stimulate” consumption as this then gets the economy ticking again. Let’s not forget how during the economic slowdown in the early 1990s, the then US President George Bush walked down shopping malls urging fellow Americans to buy, and buy more.

Now China’s Xi Jinping has been making trips to his factories and shops, urging people to consume more and to buy domestic products. Xi wants to re-tool his country’s economy from exports to internal consumption. It is the ultimate nightmare for western environmentalists, who could do so little to drive change in their own countries, that every Chinese or Indian would begin to consume like an American. But horror it will be as countries rush to open up and re-up the brown business again.

But I believe there are imperative that will make us want to change — from the small individual size triggers to the big societal and economic levers. If we do not want to go back to office from 9 am to 5 pm, five days a week, and want to adopt that new hybrid work model, there will be costs to the formal economy as we know it today. It will need to be repositioned so that new jobs are created. These jobs will not come from the businesses we know today, but from the ones we will need in the future.

But I believe the most critical difference will be the fact that there will be less cash going around. Whatever governments may say, covid-19 has shattered economies. Furthermore, there are multiple crises that will need public spending — from rebuilding after floods and other such disasters to the continuing health crisis and loss of livelihoods. So, unless governments are completely out of touch with their realities — and this could happen as technology can create false narratives at the scale and sophistication never seen in any past autocratic leaders’ propaganda machine — they will have to invest in the well-being of many as against the wealth of some.

This then means working deliberately on strategies that address the local needs and to invest in these communities. This is because there is just too much inefficiency in the transfer of resources — water, cash, food or work — from the faraway to the local. It is much better to invest in ways that can sustain growth and build resilience for the next inevitable shock. This then is where our mindfulness will be needed. So, as we open up in the still covid-19-racked and ravaged world, let’s take time to think about what we treasured the most in this disruption. And what we want to keep, and what we want to change. This is how we will re-work the future.
Engage

Hang on to the figures
This is with reference to the article "Every 4th suicide in 2019 by daily wage earners", published on the website on September 2, 2020. The data—0.01 per cent of our population—seems to be an underestimate. Suicides among the unemployed, farmers and the daily-wage earner categories have not been properly accounted. What is needed is coherence in policymaking and the focus should be on Farmer, Education, Employment and Distress (fied), especially in these testing times of covid-19, which has already accentuated the risk of suicide among the masses due to mental distress caused by the lockdown.

ASHISH MEHRA
VIA EMAIL

MGNREGA: the path ahead
The article "Susaas: today and tomorrow" (1-15 September, 2020) by Sunil Noron was an eye-opener. It should silence the critics of this rural employment generation programme as it has helped poor, unemployed and landless farmers to get a livelihood option in these devastating covid-19 times. The author rightly says that the government should not only focus on the "work done", but should also measure the sustainability of the assets created. This will offer jobs as well as strengthen the rural natural resource infrastructure.

VERONICA M
VIA EMAIL

Regimental thinking
This is with reference to "Zero-budget natural farming (ZBNF) brought big gains for Andhra farmers, shows study".

Solve the mystery!
The article "Still a mystery" (1-15 August, 2020) was thought-provoking. It is a worrying trend and all stakeholders concerned must probe why these mysterious diseases are occurring. The scientific community needs a technical boost, as per the report. New discoveries are the need of the hour. Therefore, a meticulous plan of action and proper mechanism must be devised to diagnose these diseases that are causing havoc to human life. It is time to voice our concerns and join hands with the noble mission of Down To Earth to make everyone aware and responsible.

JAYANAPA TOPADAR
VIA EMAIL
Published on the website on September 4, 2020. The authors of the study focused on rice cultivation, without looking into the background of practices in cultivation methods in the past decades.

The agronomic practices of reduced irrigation and soil variation through intercultural operation using rotary weeder is due to the System of Rice Intensification (SRI), and not from 2x2, claims the study. The farmers who practice organic farming through us are using liquid manures for pest management. Attributing everything to 2x2 is misleading. This kind of regimental thinking is not good for the development of ecological approaches that focus on diversity.

JACOB N
VIA EMAIL

That vice chancellors of all the four agricultural universities in Maharashtra, where the author started the 2x2 concept, have said the concept requires scientific validation. Such articles may confuse the public.

S V PRAKASH BAO
VIA EMAIL

What about others?
This is with reference to the article “Why should only jumbos matter?” (1-15 July, 2020). Unfortunately, conservation has today become an eyeball game. So tigers, elephants and other charismatic species get the highest eyeballs. But just compare this with the number of people working on vultures, or people working on endangered species of flora. The results will be stark.

I research and work on the ground trying to restore forest tracts invaded by Lantana plants, and let me inform you that it is a lonely world out there. We live, sadly, in a world where visibility matters a lot. Bees have become extremely rare in forest areas because of the indiscriminate use of pesticides in forest-cutting villages. It is a catastrophe for forest regeneration. But who speaks about this? Bees do not roar or trumpet.

RAMESH VENKATARAMAN
VIA EMAIL

Vultures are rapidly disappearing in India. Between 1998 and 2016, around 40 million vultures died across India due to diclofenac, a veterinary drug given to cattle as a pain reliever. As vultures fed on cattle carcases, the drug entered their blood stream causing kidney failure, and eventually died a painful death. The video also describes the efforts being taken to restore the population of vultures.

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6 DOWN TO EARTH 16-30 SEPTEMBER 2020 DownToEarth.Org.In
As economic activities restart, public transport has some Alive in the national capital. But confined spaces and limited ventilation in vehicles give rise to fear of increase in the number of covid-19 cases.
How safe is your hand sanitiser?

BANJJOY KAUR

THE ONE product that has made its way into most homes across the world, including India, in the wake of the novel coronavirus disease (COVID-19) pandemic, is hand sanitisers. However, India has no database or government website for consumers to know which brand is spurious. Some guidelines are available at the Central Drug Standard Control Organisation website but they were last updated in 2017 and are outdated in the current situation.

Contrast this with the United States Food and Drug Administration which has a ready reckoner for its citizens. Relevant information—which products are genuine and which fake—is just a click of the mouse away. In the absence of clear cut mandate, India’s sanitiser manufacturing industry went into an overdrive in March. The Union Ministry of Consumer Affairs issued a couple of letters to chief secretaries of states saying they should ask drug controllers to expedite providing licences for manufacturing. At the same time, it lifted the mandatory licence needed to sell sanitisers meaning anybody could now sell it.

This was a reckless decision, claims the All India Organization of Chemists and Druggists, which wrote a letter to the Centre on July 21 against it. “Sanitisers also contain chlorhexidine, hydrogen peroxide, isopropyl alcohol, glycerol and ethanol that need to be bought and sold in licenced premises. When the sanitiser is sold from a pharmacy, there is a government machinery to control,” it reads.

While promptness has been shown in removing all possible bottlenecks for manufacturing, it has not been backed with necessary checks. So, several cases of sale of spurious sanitisers have emerged across the country. In August, the Kolkata police arrested two persons and confiscated 1,400 litres of spurious sanitisers from them. Delhi shops were found flooded with spurious sanitisers which did not even bear a name. Over 1,000 such bottles were confiscated in Ludhiana, Punjab in June. Six persons were arrested in Hyderabad for selling spurious sanitisers in March. Sixteen died in Andhra Pradesh after consuming fake sanitisers for which 10 people were arrested.

"WE FOUND HIGH LEVELS OF ADULTERATION IN OUR TESTS"

The Consumer Guidance Society of India recently tested several sanitisers sold in Mumbai and found 14 were adulterated. M S Kamath, secretary of the consumer body, talks about the findings and their ramifications.

What are the key findings of the study?

We collected 122 hand sanitiser samples from Mumbai, New Mumbai and Thane and tested them in our laboratory. In 45 of them, the composition was different from what was claimed on the product label. For instance, a sanitiser named Holikin contained 45 per cent ethanol while the label claimed 62 per cent. One of the samples of Patanjali was also found adulterated on this ground. In five other sanitisers we found methanol which, according to WHO, cannot be used in hand sanitisers.

What could be the reasons for the violation?

While ethanol invites liquefied methanol, which was used as an alternative in some of the samples, has no toxic on them. Such acts are going unnoticed right now because everybody is using them.

How can we ensure that the sanitiser we buy is not spurious?

We should be vigilant. One option is that residents welfare associations pool in money and get sanitisers that are being used in their localities tested by an independent lab. The test costs around Rs. 1,200.
Private players run almost all coal mines with PSUs

ISHAN KURITI

MINE DEVELOPER and Operators (MSOs) have been running 13 of the 14 operational coal mines allotted to various public sector undertakings (PSUs) since 2015. An MSO is a shadow for a PSU with zero mining skills. These private companies undertake all mining work on the PSU’s behalf. The biggest among them is Adani Enterprises, which produced 31.061 million tonnes of coal in 2019-20. Of the total 35 coal mines allotted to MSOs during the same period, 21 have been given to Adani. Only 14 of these 35 coal mines are operational, reveals the coal ministry’s response to a query filed under the Right to Information (RTI) Act by this correspondent.

As many as 28 coal mines across the country are being run by MSOs, according to the ministry’s response. Most of these mines belong to MSOs, a few of them were auctioned to private companies such as Hindalco Industries Ltd, Reliance Cement Company Pvt Ltd, Bhor Aluminium Co Ltd, R S Ispat Ltd and Ambuja Cements Ltd.

“There is no mention of PSUs in the Coal Mines (Special Provisions) Act, 2015. Also, there is little transparency about the terms and conditions through which these private companies get control of coal mines given to MSOs,” said Alok Shukla of non-profit Chhattisgarh Bachao Andolan.

These coal mines in question were allotted to run under the Coal Mines (Special Provisions) Act, 2015. The Act came into force after the Supreme Court deemed illegal 204 of the 218 captive coal mines allotted between 1993 and 2011 on the grounds that the allocation procedure followed was arbitrary and no objective criterion was used to determine the selection of companies.

EXTREME

139,123
people committed suicide in 2019, highest in the past five years

Every 4th suicide was committed by a daily wage earner

7% of the suicides were committed by people dependent on farming. This translates to 28 suicides in the sector every day

6 states—Maharashtra (15,827 suicides), Karnataka (13,992), Andhra Pradesh (10,729), Madhya Pradesh (9,140), Chhattisgarh (8,899) and Telangana (4,999)—account for 83% of the deaths committed by persons involved in the farm sector.

86% of farmers who committed suicide owned farm land

Source: Accidental Deaths and Suicides in India Report 2019, NMECF

OVER 500 academicians, scientists, and researchers from 130 educational institutions across the country have written a letter urging the Union environment ministry to withdraw the controversial draft Environment Impact Assessment notification released in March this year for suggestions. The institutes whose members have signed the letter include the Indian Institute of Science, Indian Institutes of Science Education and Research, Indian Institutes of Technology, National Centre for Biological Sciences and Wildlife Institute of India.

They claim the Master notification “fundamentally” dismantles “environmental safeguards to promote ease of doing business” (see Cover Story on p65).

ON MAY 21, 2019, a short gravitational wave signal came from two gigantic black holes weighing at least 85 and 66 times the mass of the sun. On September 2, 2020, astronomers declared it the biggest collision ever detected that led to the formation of a black hole 150 times the mass of the sun. The collision was observed by the National Science Foundation’s Laser Interferometer Gravitational-Wave Observatory, the world’s largest gravitational wave observatory, and the European-based Virgo detector and Virgo Scientific Collaboration.
Raising a stink!

A village in outer Delhi is sinking in wastewater overflowing from the Najafgarh drain. That’s because of construction over a wetland, which has blocked the natural water channels. Extreme rainfall has worsened the crisis.

ISHAN KUKRETI RAOTA IN SOUTHWEST DELHI

If you wish to enter Raota village, located on the Delhi-Haryana border in the national capital’s southwest district, you will have to first wade through knee-deep wastewater. Here, roads resemble a sewer and people use boats to commute. Wastewater has entered almost every house. There is not a single patch of dry land visible and the rice farms look like underwater weeds. Officially, Raota is a part of Delhi, but village looks nothing like the rest of the capital—no clean drinking water, electricity or street lights.

For the past 15 years, this village has been inundated with wastewater from the Najafgarh drain (earlier, the Sahibi river) which separates the two states. The drain gets wastewater from residential colonies and industries in Gurugram. A study by Delhi-based non-profit Centre for Science and Environment in 2005 found that about 50 per cent of Gurugram’s sewage finds its way into this drain. When there is heavy rainfall—like during this year—it exacerbates the crisis. When Down To Earth (ttc) visited Raota on August 27, more than 288 hectares (ha) of farmlands, roads and empty plots were submerged in wastewater.

Experts say the flooding is due to unregulated
construction activities over the Najafgarh wetland, where the Najafgarh drain empties. This has shrunk the size of the wetland—from 220 sq km in the pre-Independence era to a mere 7 sq km today. A report by the National Remote Sensing Centre, Hyderabad, says the build-up area in the Haryana sub-region of National Capital Region increased by 38,002 ha between 1999 and 2012. In the same period, the area of wetland plummeted by 17,539 ha. “Earlier, wastewater would recede after the monsoon, now it stays throughout the year,” says Surej Mal, a 96-year-old resident of the village.

Neha Sinha of the Bombay Natural History Society, who has studied the Najafgarh wetland, says: “Over the years, construction on the wetland on the side of Haryana and the creation of bunds have destroyed the natural water channels and impacted the flow of the Najafgarh drain.” Ecologically, sewage water should be treated before it is allowed to flow, but that is not happening here.

PASSING THE MUCK
“When we go to the municipal council, he says floodwater does not come under his domain, and, when we write to the Government of India, the response is that it is the responsibility of the Delhi government,” says Surej Mal. “We have knocked on the door of every authority, but have not got any help,” he says. “Earlier, when we faced a problem we would go to the village pradhan and it would be resolved. Now there is nobody to listen to us,” says Vatan Phalawal, a resident of the village.

Raat’s problems are a manifestation of a bigger problem faced by many Delhi’s villages: the third tier of the governance system—panchayati raj—is missing. In 1961, there were 360 villages in Delhi. Today, there are only 132, according to the 2011 Census. Others have been subsumed by the Delhi Development Authority to satiate the ever-growing housing needs of the capital.

Ironically, Delhi was one of the first states to implement the Panchayati Raj Act, 1952—the first pan-
by the Congress-led government in 2004. The Delhi Village Board is responsible for infrastructural development of villages in Delhi and is headed by the minister of development of the Delhi government.

“But funds for village development are being spent on creating illegal colonies on farmland. That's why villages like Raota remain without basic amenities,” alleges Parash Tyagi of the Centre for Youth Culture Law and Environment, a Delhi-based non-profit working on issues related to Delhi's villages and helping the residents of Raota and many other villages to solve their problems. Tyagi tried to reach the district commissioner and the municipal councillor, but there was no response.

Tyagi says that villages such as Raota are deliberately kept underdeveloped using policies like abolition of panchayats so that such areas can be used by builders. “The budgetary allocation for rural development of Delhi is the least in the country. These are the only pieces of land which can be developed in Delhi now. By keeping these villages underdeveloped, the government is trying to push people out and give these lands to developers,” says Tyagi.

“Already, many companies have bought land in Raota and many village residents have left,” says Tyagi. For instance, 31-year-old Rajesh Kumar, whose 1.5 ha is submerged in waste water since 2006, is now working in a travel company in Gurugram.

Those who stayed back in the village are struggling to stay alive in wastewater. Take the case of 37-year-old Vikas Kumar, whose house is supported by bamboo beams. But he has given up all hope. "I know my house will collapse any day. The government just doesn’t care,” he says. Many houses have already submerged under wastewater.

The Delhi government belatedly woke up in 2014 when it prepared a draft—the Delhi Nagar Swaranj Bill—which proposed the creation of Mohalla Sabhas that would have powers similar to the provisions under the Panchayati Raj Act. “But nothing has moved. The bill lies in cold storage,” says Tyagi.
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CLIMATE CHANGE / ENERGY

Time ticking for coal

Business-as-usual will not work to combat climate crisis. Difficult targets must be set to reduce carbon emissions

PRATHA JHAWAR

The world has been stuck with coal for years. The carbon-spewing fossil is still the biggest source of energy. The transport, manufacturing, construction and power industries are driven majorly by coal. But with 72 per cent of the world’s greenhouse gas emissions arising from the energy sector, it’s now time to kick this dirty habit.

Already, frequent and extreme weather events like cyclones, bushfires, floods and droughts have wreaked global havoc. The average atmospheric CO₂ level has crossed the permissible 350 parts per million (ppm) to as much as 415 ppm. If the world does not abandon its business-as-usual approach, global warming will rise to 1.5°C above pre-industrial levels within just 10 years. This will have serious implications on natural and human systems. Global warming has already hit the 1.2°C mark.

The COVID-19 pandemic has given temporary relief to environment, but countries must not use it as an excuse to lower their ambitions to combat the climate crisis. Instead, the pandemic must work as the springboard to build back a better world. At the International Energy Agency’s Clean Energy Transition Summit held recently, UN Secretary-General Antonio Guterres said that coal and fossil fuels have no place in COVID-19 recovery plans. “It’s time
to embrace the vast opportunity of a clean energy future—a future that protects people and planet, and promotes prosperity,” he said.

In its special report on global warming in 2018, the Intergovernmental Panel on Climate Change (IPCC) had stated that staying within 1.5°C would require all coal-powered electricity to zero out by 2050. To achieve this, the more polluting older coal plants should be shut down first, says Climate Analytics, a European think-tank. This means developed countries, who are the worst polluters, would have to make the initial transition. The think-tank prescribes that coal must be phased out globally by 2040. It has set 2031 as the deadline for 27 OECD countries (Organisation for Economic Cooperation and Development). These countries are responsible for one-third of global emissions and their per capita emissions are twice the global average.

Eastern Europe and Latin America should phase it out by 2031 and 2032, and non-OECD Asian countries have 2037 as their deadline.

So how is the world faring? In 2015, as many as 186 countries signed the Paris Agreement, which stipulates that global temperature rise must remain “well below 2°C” by century-end. These countries have also submitted their Nationally Determined Contribution (NDC) targets. Yet, several are consistent with 3°C warming by 2100.

COUNTRIES FALTER
Each country is due to submit its updated NDC target this year. Eleven, which have already submitted these, are cumulatively responsible for 4 per cent of the total global CO₂ emissions. Climate Action Tracker, an independent body that assesses emission reduction targets, finds the targets set by countries are mostly “insufficient” or “highly insufficient” for limiting temperature rise to even 2°C, leave alone 1.5°C.

In the US, even the most ambitious climate plan, proposed by Presidential front-runner Joe Biden, targets a carbon-free power sector by as late as 2035. The Russian Federation’s NDC target is “critically insufficient” to stay within the Paris thresholds. Japan, the sixth most polluting country, plans to install new coal-fired plants of 18-GW capacity instead of shutting down the old ones. This would increase its existing coal capacity by 40 per cent. Japan’s energy minister Kajiyama Hiroshi says since they do not have the potential to develop renewable energy, they will provide technological assistance to carbon emissions, is on a totally different trajectory. It has an installed coal capacity of 973 GW (much of this underutilised) and plans to add another 199 GW. It is also the biggest international coal funder.

India may have started focusing on renewable energy but coal still provides over three-fourths of its electricity. It is constructing new 60-GW capacity coal-based plants and plans to build even more. So by 2030, coal will still have a major share in India’s power generation.

Studies show the reality is grimmer than suggested by IPCC. A 2020 study by Geneva-based World Climate Research Program shows that Earth’s atmosphere is much more sensitive to CO₂ than perceived so far. It says the temperature rise caused by doubling of CO₂ levels since pre-industrial times (estimated to be 260-280 ppm) would trigger 2.6°C to 4.1°C in average warming, putting the lowest rise more than one degree above scientists’ previous estimated range of 1.5°C to 3.5°C.

In another study published in Nature Scientific Reports, Thomas Chalk, a researcher at the University of Southampton, warns, “Our CO₂ levels are rising at about 2.5 ppm per year, meaning by 2025 we will have exceeded anything seen in the last 3.3 million years.” If the new norms are not serious about rapid phase-out of carbon-intensive energy, decades of planetary crisis await.

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COAL MUST BE PHASED OUT GLOBALLY BY 2040, SAYS EUROPEAN THINK-TANK CLIMATE ANALYTICS. IT HAS SET 2031 AS THE DEADLINE FOR 27 OECD COUNTRIES AND FOR EASTERN EUROPE, AND 2032 FOR LATIN AMERICA

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ON SLIPPERY PEEL

Panama wilt infection has ruined banana plantations across the world for 50 years now. While scientists are trying to find solutions in natural fungi and gene editing, the answer might be in exploring banana’s forgotten cousins.

MEENAKSHISUSHMA LUCKNOW and SANT KABIR NAGAR in UTTAR PRADESH

The last flower has fallen in Sudarshan Maurya’s farm, located on the foothills of the Himalayas along the Nepal border. The cool and humid air of Khuniyamblock in Siddharthnagar district of Uttar Pradesh is just right for bananas, which have grown well rounded in Maurya’s farm and are ready to be picked. Yet, a strange sense of uncertainty hangs over him. Every day he visits his 5-hectare farm and carefully checks each plant and their leaves. At one end, rows of banana plants stand withered, discoloured and without any bunches. “There are at least 5,000 such plants,” he says, with a heavy voice. “We knew they would face losses because of the Covid-19 pandemic. But we were not prepared for a disaster like this. The leaves started turning yellow around May. By July, I could see them dying. I have sprayed all kinds of pesticides and other chemicals and spent almost ₹12 lakh on their upkeep in the past one-and-a-half year. I don’t think I will recover the investment,” Maurya says.

The story is no different for the 20 other banana farmers in his village Belwa, who say their earnings have reduced to less than half. “We have been facing the infection for the past four to five years. But this year, it spread rapidly due to excessive rainfall,” says Chhotes Chandhary, who owns about 1 ha. “A few plant scientists have visited our village in recent months. They say it is a type of cancer for which there is no cure.”

Siddharthnagar has been identified as one of the hotbeds of Panama wilt infection, which is now pushing the world’s most cherished fruit to the verge of extinction. The infection is caused by a new strain of an old enemy—Fusarium oxysporum, a soil fungus. The strain, described as F. oxysporum fsp. cubense Tropical race 4, or simply TR4, has proved lethal to over 80 per cent of the 1,000-old banana varieties available worldwide, including cavendish that represents the image of banana, provides half of the global supply and 95 per cent of export supply.

Since its appearance in Taiwan 50 years ago, the disease has spread to 18 countries, hopping continents—it was first reported in Asia in 1970, Australia in 1997, Africa in 2013 and in Latin America in 2019 (see ‘The other pandemic’, p20)—and is jeopardising the $35-billion banana industry. But more than that, says the Food and Agriculture Organization (FAO), the infection has risked 400 million people for whom bananas and plantains are an inexpensive source of nutrition and a major source of livelihood. TR4 Task Force, created by FAO in 2013 to manage the outbreak, calls the strain “one of the most aggressive and destructive fungi in the history of agriculture and the world’s greatest threat to banana production”.

In India, the Indian Council of Agricultural Research (ICAR) conducted a survey soon after farmers in Bihar and Uttar Pradesh complained of a mysterious disease.
in 2017. Their initial mapping shows TR4 has so far infected over 3,000 ha of plantations in Bihar and 8,474 ha in Uttar Pradesh. Worse, the outbreak has hit India, the largest producer and consumer of the fruit, at a time when it was getting ready to take on the export market. By 2018, the country’s total area under banana had doubled from 470,000 ha in 2000, says a market review published by NIA in February 2020. TR4 is now forcing many farmers to give up banana altogether. Rabi scientists say while the disease has so far been reported by plantations growing cavendish varieties, such as Grand Naine (G9), Robusta, Bunchaval, Basrae and Shrimanth, traditional favourites like Malabog and Rambog are also susceptible to the infection. These varieties are important sources of nutrition and income to small farmers and rural households.

Nagendra Maurya, a farmer from Totaha village in Sant Kabir Nagar district of Uttar Pradesh, explains the economics of traditional varieties. Farmers in his village grow G9, but they are still holding on to the traditional Rambog, Padma 1, Padma 2 and Chinni kela. These can withstand heavy rains and wind, where as G9 falls off easily. Besides, traditional varieties are more in demand. Rambog has markets in Delhi and Nepal. “Scientists should develop a tissue culture variety for it to prevent the spread of infections,” says Nagendra. Besides, farmers at Totaha say there is a difference in the way these varieties respond to Panama wilt. An infected G9 usually breaks off and gives a bad smell. Its stem becomes slimy. But traditional varieties do not break. Understanding these aspects will help assess TR4 better, infamous for its stealthy attacks.

Encased in a hard shell, its microscopic spores can spread across the world by hitchhiking rides on anything from the farm worker’s boots, vehicle tyres to infected planting material or contaminated soil and water. While one microscopic spore is enough to kill an entire plant, it can survive for as many as 40 years in the soil. Once in contact with the host plant, it produces thread-like hyphae that enter the roots through natural openings and wounds. The hyphae then grow through the corn into the vascular system, preventing movement of water and nutrients. Eventually, the plant wilts and dries. An alert by the government of Queensland, Australia, which has been grappling with the infection for over 30 years, states there is currently no practical way to detect the disease until external symptoms start showing. It cannot be eliminated from the soil using fungicides or fumigants. Rao estimates if left unchecked, TR4 could destroy a majority of banana plantations by 2040.
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REPLAY OF HISTORY

*Pseudomonas solanacearum* has made a similar attempt to annihilate the fruit in the past. It was early 1970s. A young American sailor, Lorenzo Dow Baker, had just returned from Jamaica with green bananas. As the variety, Gros Michel, turned yellow gold, it became the favourite of the Americans, and Baker set the foundation of the modern banana production industry. But soon, a lethal blight colonised plantations in Panama. It was by Race 1, one of the four strains of *F. oxysporum*. Over the next few decades, the strain spread and wiped Gros Michel out of each export plantation on Earth by the 1950s.

This prompted the industry, already haggled to profits from large-scale monoculture production, to scramble for an alternative. It found solace in the less sweet and less sturdier cavendish, which was left unscathed by Race 1.

So, does this mean we can now replace cavendish with yet another resistant variety? Well, there lies the catch. The world has nearly run out of alternatives since cavendish replaced the Gros Michel.

Banana is among the world’s oldest domesticated crop. It has descended from two wild varieties—*Musa acuminata* and *Musa balbisiana*—that originally grew in Southeast Asia and contained hard seeds. These propagated sexually by seeds and asexually by suckers.

Over tens of thousands of years, random mutations led to the evolution of seedless fruits, which were more edible. Our early agriculturists domesticated these sterile mutants by propagating them vegetatively, through suckers. While this helped banana rise to the top of most consumed and traded fruit, it came at the cost of genetic diversity. Today, plantations are filled with genetically identical clones, produced in laboratories. They have a uniform cultivation cycle, produce identical fruits and, in case of an infestation, get simultaneously wiped out.

This trait of bananas failed Gros Michel, and is now acting against cavendish. After the 1950s, as the industry ramped up its plantations it produced more sterile cavendish clones. Today, cavendish accounts for over 41 per cent of bananas grown worldwide, and for 60 per cent in top producing countries. Its ubiquity can be gauged from the fact that even subsistence farmers now grow cavendish, making the hunt for resistant varieties an arduous task. Though developing hybrids is a common way of improving disease resistance in plants, it is complex for banana, which begins with first finding traces of fertility in its varieties.

The TR4 Task Force says the most effective approach is to contain the fungus as soon as it is detected and prevent its spread. In 2018, Australia tried putting in place biosecurity measures to halt the spread of TR4. It introduced strict rules to prevent foreign soil from entering the country. Infested farms were fenced and quarantined. Farm owners were directed to ensure distance between plants and disinfect any equipment or vehicle that came in contact with...
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the infected soil. The practices were audited by biosecurity officers at regular intervals. It worked well, but only for a while.

So in August 2019, when the fungus was reported for the first time on banana plantations in northeastern La Guajira, Colombia, it sounded the death knell for the fruit. Colombia is the fourth largest exporter of banana. The government declared it a national emergency. Its neighbours closed borders with it. Together, Latin America and the Caribbean are the world’s largest exporting region, particularly catering to the demand of EU and the US. While the fungus does not seem to have spread beyond La Guajira, the event has given new urgency to the efforts to prevent the scourge.

**RACE TO SAVE BANANA**

One of the successful trials to stave off the infection is going on in India. For the past few months, every Sunday Bapin Singh prepares a solution to the exact specification of the Central Soil Salinity Research Institute (cssri), Lucknow, and pours it around the banana plants on his 0.5-ha farm in Dumari kala village in Bihar’s Sitamarhi district. “It acts like a healing potion,” says Singh, who started growing bananas three years ago. “Last year 100 plants got infected with Panama wilt which cost me ₹10,000. That’s when I contacted cssri officials. All my plants turned green within two months of applying their formulation,” he says.

Damodaran says the formulation is a novel strain of another fungus, Tricoderma FZ, which acts as a biofungicide against TR4. By creating an envelope around the roots, it first checks the entry of TR4 hyphae into the plant’s vascular system. Then it triggers an immune response in the tree which releases an anti-fungal chemical that inhibits its growth. The plant thus gets back its vitality. Developed as a joint effort by cssri and the Central Institute of Sub-tropical Horticulture (cish), which is headed by Shailendra Rajan, both under ICAR, the scientists have named the formula-ion IOX-FUSION and claim to have revived 110 ha of severely affected banana plantations in Bihar and Uttar Pradesh. “In the process, we have restored an income of ₹16.33 crore among farmers,” he says.

Simultaneously, the team is working on bio-immunisation technology that will make the plants resistant to TR4. The technology is similar to vaccination in humans. The bio-immune plants are prepared by injecting bioactive components into plant tissues during tissue culture. Under first phase trial, they have planted 3,000 bio-immune cultivars in TR4-infested field in Schawal district of Uttar Pradesh. “The plants are now four months old and growing healthy even without application of fungicide. If the crop survives the disease up to October, the technology will be first of its kind in the world. It would help revive more areas with moderate supplementation of the fungicide formulation,” says Damodaran.

**BUT INDUSTRY IS RESTLESS**

In several countries, where banana is the backbone of their export earnings, the industry and governments are in a hurry to engineer the Uber-banana through a mix of approaches. In July, soon after Colombians declared national emergency to contain TR4, James Dale, a biotechnologist at the Queensland University of Technology in Brisbane, was flooded with enquiries about a variety that he and his team developed by inserting a gene from the wild banana Musa acuminata malaccensis. Dale is now conducting a field trial of the transgenic cavendish on land infected with TR4 in northern Australia.

China, severely affected by TR4 since early 2000s, has developed five resistant varieties, using another technique—chemical mutagenesis. Under the process, scientists use chemicals, gamma rays, or X-rays to speed up the natural process of mutation and create plants with random mutations. The breeder then chooses the one with desired traits and uses it to produce new varieties. Two of its varieties, ZJ4 and Baxi, have shown complete resistance. The Philippines is also in advanced stages of developing resistant varieties using mutagenesis through gamma irradiation.

Industries are using even more advanced techniques. In August, Ello Life Systems, a US food and agriculture firm, and the Dole Food Company, one of the world’s top banana suppliers, announced a partnership to develop multiple varieties.
Fostering a Sustainable Community in Mawphlang

The Khasi tribe of Mawphlang, near Shillong in Meghalaya, shares a close harmony with nature. When Himalaya first visited Mawphlang, we were inspired by their love for nature and rich heritage. For centuries, they have been preserving the forest lands. But in the recent past, the younger generation has migrated to cities in search of better employment opportunities. Himalaya in association with SYNJUK, a local NGO, is helping Mawphlang turn into a sustainable community. As a first step, we’re creating opportunities for the local youth by training them in the traditional methods of livelihood, such as vermicomposting, apiculture, and mushroom cultivation. We have conducted extensive training programs on scientific techniques and live demonstrations by experienced professionals. To kickstart the program, we have provided the necessary resources and equipment and will continue to extend technical support through our on-ground partners.

Himalaya organized tree plantation drives and planted close to 30,000 indigenous tree saplings to conserve the biodiversity of the region. We also conducted comprehensive health camps in the region as part of our ‘Healthy India, Happy India’ campaign and reached out to over 1000 individuals from the villages of Mawphlang and Nongrum. Himalaya is working towards improving the financial condition of the local community in Mawphlang and helping them become self-sufficient.
varieties resistant to fusarium wilt. Elo plans to use its proprietary gene editing technology—a booming endonuclease-based platform found naturally in primitive plants and algae—to cut out faulty dna or insert new genetic material.

In the UK, start-up Tropic Biosciences has joined the race with its novel editing (gene editing induced gene silencing) technique. Gilad Gershon, chief executive officer of the firm says, “We are the leaders in the space with over 75 professionals working on banana genetics. We were already working to improve the quality of the fruit, for example improving its shelf life. Now we are developing varieties resistant to Panama disease. It will be commercially available in 3-4 years.”

**SO ARE WE THERE YET?**

It is difficult to predict. Crops, whether developed through genetic modification, mutagenesis or gene editing, have long been controversial for their effect on health and the environment. GM crops have faced public pushback around the world. The EU has restrictive rules against GM crops. Recently, it has said it will treat gene-edited crops and organisms obtained by mutagenesis at par with crops. Besides, none of these techniques address the basic flaw in commercial banana that over and again pushes it to the verge of extinction—commercial plants are genetically identical and cannot defend themselves against Panama disease. Even if uber-bananas get to rule the market for a while, they would be clones of each other and knocked out by any other pathogen, which too are mutating and evolving outside a laboratory.

R Thangavelu, scientist at the National Research Centre for Banana (NRCB) in Tamil Nadu, says Race 1 has already mutated. “In Thanal district of Tamil Nadu, we found G9 being infected by Race 1. TR4 strain in India is also different from the strain damaging plantations elsewhere in the world. As of now, TR4 is more active in northern India where cavendish is dominant. In southern parts, Race 1 is causing Panama wilt in traditional varieties. But we have observed that two varieties, red banana and neelkan, do not get affected by Panama wilt.”

Being the cradle of banana, genetic diversity of edible banana species in the country is vast. Even though cavendish provides 65 per cent of the commercially grown bananas, the remaining comes from nearly 20 traditional varieties. There are at least 320 other varie ties grown on a small scale. “There is an urgent need to identify and promote varieties that are naturally resistant to TR4,” says R Unn, director, NRCB. (With inputs from Vivek Mishra in Siddharthnagar, Uttar Pradesh and Snehal Das in New Delhi)

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ADVANTAGE INDUSTRY

Government after government has diluted the environment impact assessment process, effectively making it a ritual practised without any reverence to the environment. The draft Environment Impact Assessment 2020 Notification is the latest proof. An analysis by

NIVIT KUMAR YADAV & ISHITA GARG
At the headquarters of the Ministry of Environment, Forest and Climate Change (MOEFCC) in New Delhi, the 21-odd staff members of the three Environment Impact Assessment Divisions had an impossible task: to scrutinise some 1.7 million suggestions, comments and objections received through e-mails and by post in the past five months. Technically and by law, every correspondence has to be carefully studied to cull out the ideas and feedbacks that will form the basis of India’s environmental governance in the days to come. MOEFCC has, by media accounts, allocated this work to the Nagpur-based National Environmental Engineering Research Institute.

The communications received are in response to the Union government’s draft Environment Impact Assessment (EIA) 2020 Notification. Arguably, no other environment-related notification has gathered such a response. Most of the comments are against the proposed provisions.

On March 12, two weeks before the national lockdown was imposed to counter the COVID-19 pandemic, MOEFCC published the draft EIA 2020 Notification on its website for public feedback. Some 15 years ago, in 2006, the government had adopted a new set of EIA procedures and mandatory requirements. The proposed notification will replace the 2006 Notification.

Issued under the Environment (Protection) Act, 1986, the notification is the country’s only set of legally binding regulations to “make a scientific assessment of the likely impacts” of projects such as industrial units, waste treatment plants, mining and dams. It has provisions for mandatory public consultation and public hearing for clearance by local communities.

For five months after the draft was uploaded for public scrutiny, India witnessed protests, mostly online, against it. Environmentalists and even politicians from various parties joined civil society groups to oppose the notification. They say it weakens the 2006 version; in favour of industry and legitimises projects running...
without mandatory environmental clearances. More importantly, it dilutes community scrutiny or consent provisions. In 2019, the government circulated a zero draft of a similar notification. That time too huge protests followed.

This year, the time given to the public for feedback itself triggered a campaign. First, the government gave 60 days to the public to react and after a backlash from civil society groups, who said the lockdown made wider consultation impossible, it extended the deadline to June 30. A few environmentalists appealed to the Delhi High Court for a further extension and publication of the draft in regional languages. On June 30, the court extended the deadline to August 11, and ordered that the draft notification be published in the 22 official languages. The Karnataka High Court passed a similar verdict.

The government foresaw the opposition to the latest draft notification. In March, MoEFCC quietly amended Clause 5 (3) of the Environment Protection Rules that govern the Environment (Protection) Act, 1986. This amendment gives the ministry 725 days, instead of 545 presently, to finalize the draft notification process from the day of opening it up for public comments. "It will take us some time to consider the issues raised by these comments and suggestions," said R P Gupta, environment secretary, to the media, indicating an overwhelming response to the draft.

People protesting the draft did not just target MoEFCC. Over 150 environmental groups, organizations and individuals sent e-mails to the 755 members of Parliament. Union Environment Minister Prakash Javadekar lodged a complaint with the Delhi Police against three environmental groups for dragging his e-mail inbox. These groups were temporarily booked under anti-terror laws. The protests against the proposed changes to the notification process have led to a political furor. The first charge on the government came from Sonia Gandhi, the interim president of the Congress party, who wrote an op-ed piece in a national newspaper demanding withdrawal of the draft. "Simply put, the government must stop dismantling India’s environmental regulations. An essential first step is to withdraw the draft MoEFCC 2020 Notification. What is essential is widespread public consultation to shape a national agenda that will place India at the forefront of the battle against global warming and pandemics," she wrote. Her son and former Congress president Rahul Gandhi joined the call for its withdrawal. Jairam Ramesh, chairperson of the Parliamentary Standing Committee on Science and Technology and former Union environment minister, initiated deliberation on draft
EIA 2020 in the standing committee despite objections raised by the ruling Bharatiya Janata Party-National Democratic Alliance (NDA) members. Members from the ruling party wanted discussion only once the draft was notified, but Ramesh went ahead.

Anandoddin Owaisi, a Lok Sabha member from the All India Majlis-e-Ittehadul Muslimeen, opposed the dilution of provisions and the bypassing of rigorous assessment by officials for the projects going for expansion. He is also in the same standing committee. Vandana Chavan, a Rajya Sabha member from the Nationalist Congress Party, raised questions over the approval given to building and construction projects which are destroying the aquifers.

Comments by political parties show that they recognise the substantive and procedural issues with draft EIA 2020 as raised by people, says Kaushik Kohli, senior researcher at the Centre for Policy Research, a Delhi-based non-profit. “Everyone knows that when it comes to the environment, all political parties are on the same page. But this time, public protests forced them to take a stand against the changes,” says Shilpa Choboh, advocate and partner, Indian Environment Law Organisation, Delhi.

There have been many changes in the last EIA notification, both in letter and spirit, since it was adopted. There have been numerous dilutions and political manoeuvring to bypass the stringent environmental clearance process. The proposed notification seems to be an official stamp on these.

CONCEPT OF EIA
Activities, such as mining, industrial production and building dams and roads, which are necessary for economic and social development of a country, are also harmful to the environment. Therefore, governments across the world first assess the projects in terms of their environmental impact and based on this cost-benefit analysis, work towards measures to mitigate the damage if possible. EIA is a tool to do this—it is about creating a balance between environment and development. This requires rigorous assessment of all technical and scientific issues and needs to account for the concern of local communities. The environment clearance (EC) process—a four-stage approval regime that includes appraisal and public consultation—has been mandatory for developmental projects since 1997. The government decides the kinds of projects that require EIA and can change the rules by an executive order under the Environment (Protection) Act of 1986.

EIA 2006, which is in force currently, has 59 types of projects/activities that require EIA. These are classified into two categories—A and B, with category A (51 types of projects) appraised by the Centre, while category B (28 types of projects) appraised at the state level. There are seven Expert Appraisal Committees (EACs) at the Centre for assessing Category A projects, while for Category B, each state has one State Expert Appraisal Committee (SEAC). Projects under Category B are subdivided into B1 (which require EIA) and B2 (which do not require EIA). It is at the discretion of SEACs to decide whether a project should be under B1 or B2 category, which they do on the basis of the size, location, impact and ecological significance of the area of the project.

Draft EIA 2020 proposes changes in most of these processes and categorisations. The projects/activities that require clearance under EIA 2020 have been increased to 110, purportedly for greater clarity. But in reality the new draft lists every project as a separate activity; hence, the increase. For instance, projects/activities listed under Serial Number 1 in EIA 2006 feature mining of minerals, offshore and onshore oil and gas exploration, river valley projects, thermal power plants and nuclear power projects together. But in draft EIA 2020, most of these are listed as separate projects/
CLAUSES OF CONCERN

Apart from structural changes and exemptions, there are a few other clauses in draft EIA 2020 that have led to protests

THE EXEMPTED 40

Clause 26 of draft EIA 2020 lists 40 projects that do not require any clearance. Some of these exempted projects are potentially harmful. For instance, solar thermal power plants. Unlike wind facilities, solar power plants provide little opportunity to share land for agriculture use. The selection of sites for these projects is, therefore, important to minimise land loss. Also, solar thermal plants that use wet-circulating technology require water for the cooling towers and may withdraw up to 1,300 litres per megawatt hour of electricity produced. Thin-film PV cells contain toxic materials including gallium arsenide, copper-indium-gallium- diarsenicide and cadmium-telluride. If not handled and disposed of properly, they are a threat to public health.

Draft EIA 2020 exempts cupola furnaces, used to melt metals, of up to 60,000 tons per annum (TPA) capacity.

These are extremely polluting because they use dirty fuels like pet coke or coal and must not be exempted from the EC process. The cupola furnace is an outdated and inefficient technology that generates considerable greenhouse gases and particulate matter.

The notification also exempts dredging and de-silting of dams, reservoirs, weirs, barrages, river and canals for maintenance, upkeep and disaster management. Dredging activities affect not only the site but also the surrounding areas through sedimentation, resuspension and release of contaminants.

PEOPLE CAN’T COMPLAIN

Draft EIA 2020 has no provision for people to file a complaint if a project starts without environmental clearance. Neither does it have a provision for people to file a complaint if a project has obtained clearance but is not complying with conditions mentioned in them.

COMPLIANCE REPORT FILING FREQUENCY REDUCED

Under EIA 2006, project proponents had to submit a report every six months to verify that they were complying with the conditions listed in their clearance, but Clause 26 (d) of draft EIA 2020 requires them to do so once a year.

CAPACITY ENHANCEMENT NEEDS NO PUBLIC CONSULTATION

Clause 14(2) says that a unit enhancing its capacity by up to 50 per cent with or without modernisation does not require public consultation. Capacity enhancement can result in increased use of resources, such as water. If capacity enhancement can be done without public consultations, why has it been limited to 50 per cent?

activities. Draft EIA 2020 also has predefined B1 and B2 categories, taking away the discretionary power of states. Category A will now have 39 projects, B1 will have 42 projects and B2 will have 25 projects. Apart from these, the draft EIA 2020 proposes three fundamental changes that have the potential to completely undermine the EIA process. These are:

#1 STRATEGIC CONSIDERATIONS

In August, when the Board of Control for Cricket in India wanted an extension in the tenures of its president and secretary, in contravention of the Board’s constitution, it asked for the Supreme Court’s permission to do so in “national interest”. Phrases like national interest and public welfare can be a great tool to justify any action. Draft EIA 2020 too makes use of one such phrase. Clause 9/7 of the notification empowers the Union government to grant permission to any project in all categories for “strategic considerations” and says that “no information relating to such projects shall be placed in public domain”. Since the notification does not define “strategic”, the government can undertake any project anywhere without assigning a reason or having to explain anything later. For instance, it can allow a project in the Northeast—an area rich in biodiversity as well as in gas and oil reserves—without any assessment or public consultation. It reminds one of the “eminent domain” power of the government, under the contentious land acquisition laws, that make it the sole authority to decide what is “public goods”.

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# ALTERATIONS AND DILUTIONS

Draft Environment Impact Assessment (EIA) 2020 departs from EIA 2006 in many ways, mostly for the worse.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>EIA 2006</th>
<th>Draft EIA 2020 Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categorisation of projects that require Environmental Impact Assessment</td>
<td>Projects divided into A (31 projects) and B (26 projects), as per the threat they pose. EAC at the Centre to appraise Category A. Category B divided into B1 and B2. SEACs in the state decide if a project goes to B1 or B2.</td>
<td>All categories predefined: Category A has 39 projects, B1 has 42 projects and B2 has 29 projects. EAC to appraise Category A. SEACs to appraise B1. No appraisal for B2, only online clearance required.</td>
</tr>
<tr>
<td>Projects exempted from the clearance process</td>
<td>No exemptions</td>
<td>40 projects have complete exemption</td>
</tr>
<tr>
<td>Obligation to provide a project’s draft EIA report</td>
<td>Summary and the complete report must be in English and the regional language.</td>
<td>Summary to be in the regional language and English, complete report only in English.</td>
</tr>
<tr>
<td>Time for public to respond to draft EIA report</td>
<td>30 days</td>
<td>20 days</td>
</tr>
<tr>
<td>Exemption to projects from public consultation</td>
<td>All projects going for increase in production capacity or modernization require public consultation.</td>
<td>Projects going for modernisation without increase in production capacity or up to 50% increase in capacity do not need public consultation.</td>
</tr>
<tr>
<td>Post-clearance compliance mechanism</td>
<td>Project proponent to submit compliance reports every six months.</td>
<td>Compliance report to be submitted annually. Non submission to attract a fine of Rs 50/0/day for B1, Rs 1000/day for B1, Rs 200/day Category A projects.</td>
</tr>
<tr>
<td>Post-facto clearance (when a project starts without environmental clearance)</td>
<td>No provision</td>
<td>Provision of a daily fine depending on the project category and the complaint (a suo moto acceptance of violation attracts lower fine).</td>
</tr>
</tbody>
</table>

EIA 2006 also allowed the government to clear projects for strategic reasons without public consultation. But it did not say that the information was not available to the public domain. Yet, there is no information on the APSC website regarding the number of projects that have been cleared for strategic reasons under EIA 2006. “Draft EIA 2020 goes a step further from the 2006 regulation by preventing all information of such projects being put in public domain. This, on one hand, would empower the government to decide arbitrarily areas where a large number of projects could be exempted, and on the other hand, weaken public participation in the decision-making process,” says Parul Gupta, lawyer at the National Green Tribunal.

#2 PREDEFINED: EASY CLEARANCE?

The second big change that draft EIA 2020 introduces is a predefined lists of projects in all categories and a less stringent level of assessment, called environment permission (EP), for Category B2. The entire process to get an EP—from application to clearance—will be online, says draft EIA 2020. As per Clause 3 (41), the clearance will come from the State Environment Impact Assessment Authority (SEIAA) or Union Territory Environment Impact Assessment Authority (UTEDIA). Many projects in the new B2 category have a huge potential to harm the environment and should not be cleared without appraisal. B2 now has at least three projects that were in Category A earlier (and would have required EIA), and nine projects that were in B (and could have
been assigned by the SEAC to Category B1, which requires EIA. Sample these:

**Expansion or widening of National Highways by 25 km to 100 km:** In 2006, these were under Category A. An amendment in 2013 exempted them from the EC process. The impact of the amendment was seen in the Char Dham project undertaken in Uttarakhand. As per a 2018 case with the National Green Tribunal, about 900 km of roads were constructed under the project without EC. The government argued that it was not a single 900-km project, but a combination of 53 individual segments, all shorter than 100 km. This was a clear misuse of the provision and the same can happen with projects under draft EIA 2020.

**Construction of aerial ropeways:** These were in Category A in EIA 2006. Such projects need region-specific studies on avalanches and landslides. They can cause habitat fragmentation and block migratory corridors for wildlife. Ropeways in forest areas can lead to soil erosion, change drainage patterns, generate waste water, increase risk of disasters due to technical failures and increase vulnerability during natural hazards.

**Exploration of offshore/onshore oil and gas, if it involves drilling:** Such explorations were in Category A in EIA 2006. The drilling process generates effluents that carry trace metals and oil, and get disposed off in the nearby areas. The emissions due to flares may damage the land, vegetation or wildlife if the project is close to forestland.

**#3 POST-FACTO CLEARANCE**

This is the third major change proposed in draft EIA 2020. Clause 22 deals with cases of violations—when a proponent starts the project without obtaining EC—and provides for rectification on payment of a fine. It says that violations can be brought to the government’s notice in four ways: through a *suo motu* application by the project proponent; reporting by any government authority; during appraisal; and while processing of the application by any regulatory authority. In *suo motu* cases, there is a late fee of ₹1,000 per day from the date of violation to the date of application for Category B2; ₹2,000 per day for Category B1; and ₹5,000 per day for Category A projects. The amounts are doubled in case the violation is found by a government authority or during appraisal. This clause could lead to a situation where the violation will be identified by the regulators, but they will, in lieu of a bribe, ask the project proponent to file an application *suo motu* and pay a reduced fine. It is also not clear why there is no provision for people to report a violation.

Moreover, why should a unit, which is aware of EIA provisions, be given the benefit of post-facto clearance? In 2017, MoEFCC provided one-time amnesty to all cases of violation till September 2018. This was done to allow operations of units which predate the order that made EC mandatory. Draft EIA 2020 could result in encouraging project proponents to violate and then seek EC by paying a fine. There are other similar provisions that raise concern (see “Clauses of concern” on p53). The key question is do these changes aid decision-making and streamline the EC process?

**EC PROCESS**

A project goes through four stages during the typical EC process. First is screening, applicable only to Category B, where SEAC decides if the project should be in B1 or B2. Second is the scoping stage where the proponents get the project’s terms of reference (ToR) approved by MoEFCC or the State Environment Impact Assessment Authority (SEIAA), as the case may be. ToR is a detailed guideline document which lists all the information a project proponent needs to provide while carrying out EIA. MoEFCC has developed sector-specific standard ToR’s. MoEFCC and SEIAA can approve a ToR, ask for more information or reject it. Draft EIA 2020 proposes no changes in this. After ToR has been approved, the proponent prepares a draft
Independence Day
Greetings to all fellow citizens

Jai Hind

"15th August is a day to pay homage to all those greats who worked hard for India’s freedom. Their struggles continue to give strength to millions. Independence Day is an occasion to reaffirm our commitment to build an India that would make our respected freedom fighters proud."

- Narendra Modi

Independence Day Ceremony at the ramparts of Red Fort.
Art to be live telecast by Doordarshan 6:25 a.m. onwards
The preparation of the EIA report requires involvement of 12 functional area experts. Each expert assesses the baseline conditions of the site, identifies impacts from the project, and suggests mitigation, management, and monitoring plans. The baseline data is to be collected for three months excluding the monsoon season.

As per EIA 2006, this draft EIA report and its summary should be prepared in English as well as the regional language for use in public consultation, which is the third stage. But draft EIA 2020 has no provision to provide the EIA report in regional languages; only its summary. The summary cannot possibly provide a complete understanding of the project and its impacts and indicates an effort to not share the complete information.

The third stage is public consultation. It has two components: on-site public hearing and inviting written responses. These are organized by the State Pollution Control Board for which it must publish the project details and the draft EIA report on its website. It must also publish details of the public hearing in one national and one local newspaper. EIA 2006 gave people 30 days to comment after the publication of draft EIA report, but EIA 2020 has reduced this duration to 20 days. This shows a lack of empathy towards the public, which in most of the cases has to take great pains to gather information about the project. After this, the final EIA report is prepared incorporating the suggestions and objections raised in the public consultation.

The last step is the appraisal of the project's final EIA report by DACCEAC. These
committees can approve the project, reject it or ask for more information. But rejection is quite rare (see “Never say never”); Projects are given multiple opportunities to get the clearance, or become “sustainable” by using different technologies. Between July 2015 and August 2020, only 2.9 per cent of the proposals were not recommended.

Data also suggests that MoEFCC has been quite fast in granting EIA (see “Quick to clear”). Experts estimate that if a project clears every stage of the EC process in a single attempt, it should take about a year to get the clearance. But in 2014-20, nearly 90 per cent of the projects were given EC in less than 12 months. This indicates that projects are rarely rejected or delayed on the basis of IIA.

The EC comes with a set of conditions that the project proponent must fulfill while operating the projects. For instance, they might be asked to take steps for improving the surroundings or build public facilities in nearby areas. IIA 2006 required project owners to send a six-monthly compliance report on meeting the conditions. Draft IIA 2020 requires them to do so once a year.

Throughout the EC process, the project proponents are aided by IIA consultants approved by the National Accreditation Board for Education and Training. Hiring consultants was made mandatory in 2011 because project proponents were often found to lack the skills for preparing ToRs and IIA reports. In practice, the consultants do everything on behalf of the proponents. They often misrepresent data and use all means to get the clearance. Instead of improving the process, the use of consultants has helped project proponents avoid accountability. Lack of regulatory provisions has made it difficult for the government to blacklist consultants. This is one area where draft IIA 2020 scores over its predecessor. Clause 17 (7) has a provision to debar/blacklist consultants who mislead or misrepresent data.

**NEVER SAY NEVER**

Expert Appraisal Committees rarely refused environmental clearance to projects between July 2015 and August 2020

<table>
<thead>
<tr>
<th>Proposals submitted</th>
<th>3,100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposals cleared</td>
<td>2,431 (78.4%)</td>
</tr>
<tr>
<td>Proposals returned due to shortcomings</td>
<td>393</td>
</tr>
<tr>
<td>Proposals not recommended</td>
<td>91 (2.9%)</td>
</tr>
<tr>
<td>Proposals pending</td>
<td>185</td>
</tr>
</tbody>
</table>

Source: Ministry of Environment, Forest and Climate Change

**STRENGTHEN, NOT WEAKEN**

It is clear that IIA has become a convenient bogey—something that inconveniences businesses and impedes economic growth—for all governments. The fact is that clearances are almost always given. The so-called rejection rate of projects, even as per governments own data, is a mere 2.9 per cent. (And even these rejections may not be permanent. The project could be cleared later, with changed technology or at a different site.) The fact also is that there is hardly any real scrutiny of the projects. People are heard but not listened to, and monitoring of the conditions set at the time of clearance just happens on paper. The process has already been whittled down and made ineffective. It could be argued that there is hardly any real purpose behind it and that it should be done away with. This is the direction of draft IIA 2020.

However, it is also a fact that IIA is an important procedure for scrutiny and for finding the balance between environmental safeguards and developmental needs. It can be argued that if the IIA process is strengthened, it will ensure that environmental damages are mitigated and managed. It will also minimise risks, delays and even closures of projects. If the process is not rigorous or reliable it will impinge development because people who are affected by a bad industrial project—one that pollutes their water or land, or displaces them without compensation—will protest. They will go to court. The democratic framework of the country will assist them to get justice. Similarly, if the project leads to environmental damage—destroys forest ecosystems, biodiversity gene pools—environmentalists will protest. Again, the project will be contested, delayed. An abused process will lead to abused outcomes, in the interest of none.

It is also a fact that projects are cleared with the full knowledge that there is no capacity to monitor the conditions that have been imposed at the time of clearance.
This defeats the purpose of management as projects continue to pollute and degrade the environment. It, in turn, adds to people’s anger, triggers protests and makes clearance more contentious.

India clearly needs second-generation reforms to safeguard its environment, ensure economic growth and to build a process of development which is less contested and more inclusive. Delhi-based non-profit Centre for Science and Environment (CSE) has critiqued the EC process and recommended, not once but many times, ways in which it can be both streamlined to aid ease of doing business and strengthened for environmental and social integrity. Following are the elements of this proposal:

- **Consolidate all clearances**—environmental, forest, wildlife, coastal—and make the document public so that project impact is fully understood and timely decisions taken. To do this, we should ask for one comprehensive impact assessment document covering all aspects for all clearances. There must be an effort to openly scrutinise the assessment so that people’s concerns are taken care of.

Make EACs accountable for their decisions. Currently, these committees have no responsibility to ensure that the projects cleared do not have a serious environmental impact. They simply delay the clearances by repeatedly asking for information, or they clear with a list of conditions, knowing that these conditions will not be monitored, or may not even be feasible. It is important to review their role and make them more transparent (see “Committees of conflict”).

Integrate the processes and procedures followed by the state pollution control boards under the air and water Acts, and SPCB under the Environment (Protection) Act, 1986. Currently, we have a situation where there is a serious lack of capacity and personnel on the one hand and duplication of work on the other. The same clearances are given by different agencies, under different legislations and there is nobody responsible for monitoring compliance of conditions.

Deepen public assessment and scrutiny by putting all data of public hearings in public domain. The public consultation process is important but decisions taken...
COVID-19
A NEW WORLD DISORDER
(E-BOOK)

This e-book and the articles in it, not only offers the first draft of the pandemic's immediate history but also explores what the world would be like, after this.

The covid-19 pandemic can be regarded as the globalised world's most localised emergency. To know more about it and order, please visit our website.

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at public hearings are rarely considered by EIA. Two steps can be taken to make this process stronger: one, the mandatory videography of the proceedings should be streamed real-time on the Internet. Two, all monitoring conditions and compliance pertaining to the concerns raised in public hearings should be put in public domain.

Review effectiveness of SEQA, particularly in clearance of multitudes of urban projects—the building and construction sector. Under EIA 2006, the state agencies were given responsibility for clearance of building and construction projects. There is little evidence to suggest that these agencies have been effective in controlling pollution or degradation caused by urban projects. The building and construction sector projects within municipal limits should not require environmental clearance. Instead, the focus should be to strengthen municipal guidelines for assessment and to monitor large-scale urban projects for compliance.

Strengthen data for assessment and monitoring of projects. This will ensure that the scrutiny is scientific and there is baseline data available for monitoring. The Achilles heel of the entire process is the lack of credible and up-to-date data on environmental parameters and the ecological importance of the site. Without this, every EIA report, done by a faceless consultant, paid by the proponent company, is just an exercise in paperwork.

Strengthen NPCIA’s capacity and focus on monitoring of compliance, not on clearance of projects. Currently, there is no capacity to monitor projects, once cleared. This leads to projects that have adverse impacts on the environment. It also leads to the decline of credibility of the regulatory institutions and their ability to sanction projects which safeguard the environment.

The question is if the governments—previous, present or next—really value the scrutiny of the projects, and whether they believe this assessment will improve decision-making and help mitigate impacts that could damage the environment, irreversibly. If they do not, then EIA 2006 or EIA 2020 are all just futile exercises. The governments better stop the semblance of this pretense. Taking it down bit by bit is just prolonging the charade. It is not protecting the environment.
New Initiative by HP Forest Department
EK BUTA BETI KE NAAM
A Scheme to associate
FAMILY OF NEWLY BORN GIRL CHILD
in tree planting.
Himachal Pradesh Forest Department
on the occasion of Birth of Girl Child gifts :
5 Saplings  Tree guards  Vermi compost  Name plates of Child

DOWN TO EARTH BOOKS FILMS E-DATABASES T-SHIRTS BAGS
the new refreshed revitalized
csestore

http://csestore.cse.org.in
Global negative GDP could hasten the discovery of the world’s fastest vaccine. But what are the perils?

BANJOT KAUR

A S NEWS broke of one plummeting to unprecedented levels across the world due to the COVID-19 pandemic—not to mention the record spikes in cases and deaths as countries reopened their economies—the discourse once again has shifted to vaccines. All hopes and counter strategies—from reopening of schools to restarting the engines of the economy—are now pinned on the development of a vaccine. More than ever, the world’s attention is on India, the economy is in a shambles with the one declining by 23.9 per cent—the sharpest drop since India gained independence. “But this figure is an understimate as the impact of the informal economy has not been properly accounted,” says development economist Jayati Ghosh. It is the same situation across the world; the difference is only in scale. The demand for a vaccine has never been more intense.

If truth be told, the world’s fastest vaccine—for Ebola—took four years to be discovered but it was found to have side-effects. So it is not surprising that health experts, who specialise in vaccine research, say the current optimism is not only misplaced but also fraught with the danger of a false sense of security. “Vaccines have a role to play. But they are not the only solution. Even if a vaccine is out, we do not know for how long it will be effective,” says Gagandeep Kang, a fellow of the Royal...
Society of London, who is known for her pioneering work on the rotavirus vaccine. It is significant that many patients who had earlier recovered from COVID-19 after treatment, are again re-infected. "We still do not know the correlates of protection against the virus—what amount of antibodies can neutralise the virus," she says.

Kang echoes the statement made by D G Tedros, director-general of the World Health Organization (WHO) on August 3: "There is no silver bullet at the moment, and there might never be. For now, stopping outbreaks comes down to the basics of public health and disease control—testing, isolating and treating patients and tracing and quarantining their contacts." In fact, the Indian Public Health Association (IPHA), in a strongly worded statement, says, "a false sense of hope" of vaccines should be avoided; "even after the vaccine’s arrival, a lot of people—who don’t get access to the vaccine—will fall sick." To take care of them, we need a better health infrastructure to cope with the severity of disease, says K Srinath Reddy, president of IPHA.

There is also a twist peculiar to India—the virus behaved differently in different states. So the one-size-fits-all formula may not really work and state-specific strategies are needed badly. Besides, as far as the pace of the research is concerned, Shahid Jameel, CEO of Wellcome Trust-Department of Biotechnology (India) Alliance, warns that undue pressure and confused messages of vaccines being administered without adequate trials may lead to hesitancy among people, which is already a huge problem across the globe for existing vaccines for other diseases. "Science should never be stamped," says Reddy. "The only thing that can be accelerated is the recruitment of study participants to the tune of tens of thousands for the Phase 3 trials. But we must not push the process as it will complicate health situation," adds Reddy.

So far, we have had two coronavirus epidemics—SARS in 2002 and MERS in 2012. For both, we still do not have a vaccine. Research on the SARS vaccine stopped because the disease itself went away. In the case of MERS, the vaccine has just entered the first of the three phases of human trials. Virus mutation too cannot be ruled out. So far, COVID-19 has shown several mutations, but not that big to be called a "drift" in epidemiological parlance. "But given the unpredictable nature of viruses, it cannot be ruled out," says Kang. In that case, it will nullify the ongoing research for a vaccine.

WHO WILL GET IT FIRST?

This is a million dollar question. Vaccine nationalism is already bothering WHO which has issued several statements against it. In India, the Union government has formed a committee to address this issue. While it is not official, sources indicate that the first to get access would be frontline workers, including healthcare workers and the elderly. The logistics of distribution is another important issue. Arguably, India runs the biggest immunisation programme in the world for children. Though experts suggest this can be utilised for the COVID-19 vaccine too, the programme is fraught with operational problems. Moreover, adding more work could squeeze the space for other routine vaccines given to children. Therefore, experts say the left hand of governance must tightly work in tandem with the right hand to remove operational bottlenecks.

But an intriguing question remains: how did past pandemics come to an end? Was there a strong clamour for vaccines? No. Experts say all pandemics, including the Spanish Flu in 1918-20, died a natural death. Every virus has an evolutionary cycle. The earlier pandemics ended because after causing widespread devastation, the virus became milder, and in the course of time, there was no host—people—left to infect.

All viruses are either highly virulent or less infective. COVID-19 is an exception—it is both—and therefore, more deadly. That’s why the entire scientific community is ruminating over the rush to develop a vaccine.
OPENING UP IN HASTE

India, like most countries, has test positivity rates so high that it is likely to miss new chains of transmission. Yet, its metropolitan cities have resumed public transport and offices, increasing the chances of fresh outbreaks.

The World Health Organization recommends a test positivity rate of below 5% for at least two weeks before relaxing public health measures.

Europe
3.9 million | 211,544

Asia
7.7 million | 180,910

America
14.2 million | 494,693

Africa
1.3 million | 31,302

Oceania
0.04 million | 800

RUSH TOWARDS NORMAL

In four metropolitan cities, nearly half the population has started visiting workplaces.

- Test positivity rate (7-day rolling average)
- Mobility trends in workplace against baseline

Bengaluru Urban

Delhi

Mumbai

Chennai

Test positivity rate
A low positivity rate means that testing levels are sufficient for the scale of the epidemic and surveillance is penetrating the community enough to detect resurgence. A high positivity rate indicates that testing is limited to people with high suspicion and may miss new chains of transmission.

Mobility trends at workplace
A percentage closer to zero means more people are returning to their workplaces.

Mobility trends at public transport
A percentage closer to zero means more people are frequenting public transport hubs which includes taxi stands, trains, and bus stations.

Sources: World Health Organization, European Centre for Disease Control and Prevention, and Disease Control and Prevention (CDC) Community Mobility Report, updated 18 September. Test positivity rate unavailable for Kolkata.
RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED
(A Joint Venture Company of NFL, EIL and FCIL)

Marching towards a self reliant India.
Uncertain wait for the vaccine

WITH JINGOISM and slack journalism combining to present a picture of false hope over reality, India was again awash in reports that a vaccine against COVID-19 would be widely available soon—in October no less. The reports in early August had claimed that the Pune-based Serum Institute of India (si) would be releasing a vaccine in 73 days. This is as far-fetched as it can get.

si—the world’s largest vaccine manufacturer by volume—is producing two vaccines being developed in Europe and the US, the leading candidate being the Oxford University-AstraZeneca’s vaccine which is undergoing Phase 3 clinical trials. si officially published this claim a while ago, but the company has modified the waters on vaccine availability in India with untenable statements on how much of the az1222 vaccine, as it is designated, will be allocated here.

cro Adar Poonawalla had initially claimed that “a majority of the vaccine would have to go to our countrymen before it goes abroad” and that his company would “leave it to the Indian government to decide which countries would get how much of the vaccine and when.” This is completely untenable since si is only a contract manufacturer and has permission from the government to manufacture and stockpile the vaccine for AstraZeneca. The Modi government has little to say on this matter. si later spoke of keeping half the production for India.

The fact is si does not have much leeway in how the vaccine will be deployed. In June, AstraZeneca roped in si for an agreement it signed with the Coalition for Epidemic Preparedness Innovations and Gavi, the Vaccine Alliance, for supply of its potential vaccine to Europe. The $750 million agreement—funded by these organisations and the Bill & Melinda Gates Foundation—is for 300 million doses of the potential vaccine, with delivery starting by the end of 2020. In addition, AstraZeneca has signed a licensing deal with si to supply one billion doses for low and middle-income countries, again before the end of 2020. The company’s says this is to ensure "broad and equitable access at no profit”.

Good as it sounds, one wonders how it will do so. The effort will take the vaccine to 57 eligible countries, while the other vaccine candidate of US firm Novavax, also being manufactured by si, will go to all 92 countries on the gavi roster.

Rich countries have already cornered the bulk of vaccines in the pipeline leaving very little for the rest of the world. Can we end a pandemic in just parts of the world?

How many people in these countries—mind you, this includes a large number of European states, too—will get the jab considering that the vaccines are based on a two-dose regimen?

The latest calculation, made on data provided by Airfinity, a life-sciences market analytics firm, shows that there will be very little supplies left for the low-income and even middle-income countries because the rich have already struck deals to buy more than 2 billion doses of potential vaccines. The US, the UK and EU have invested heavily in these firms which has allowed them to corner the supplies. The UK, in fact, has ordered enough doses to provide each of its citizens around five doses each, while the US, EU and Japan are not far behind. Can we end a pandemic in just parts of the world?
Palette

WHAT'S INSIDE

Prehistoric climate change damaged the ozone layer and led to a mass extinction  P48

Poor and landless farmers are missing out on both formal and informal credit  P50

Despite regulations, Kashmir is battling a solid waste crisis  P54

RECOMMENDATIONS

This documentary comes at a time when Facebook is being probed by a Parliament Standing Committee for political bias towards certain political parties. Every click on your computer—when you visit Facebook or for that matter Twitter, Google and Instagram—is being tracked and monitored by servers in the “remote” world to understand your behavior and influence your next action. That’s what the people who created these social networking sites mean in a new documentary, The Social Dilemma, which exposes the harmful side of technology. The real villain may not be just the trolls, but these sites themselves that manipulate and control our worldview. Released on September 7 on Netflix.

BOOKS

In A Natural History of Color, molecular biologist Rob DeSalle and optical physicist Rob Baker use physics, physiology, psychology and anthropology to answer a fundamental question: how do colors determine our understanding of nature, neurobiology and even individual? Using evolution as the guiding principle, they describe how particular colors and color schemas affect metaphor, memory and confuse other organisms and unravel the distinct symbolic responses to color in human beings.

Earth scientist Andrew C Scott in his new book, Fire, says the use of fire dates back to about 1.5 million years, when the earliest humans used it to keep warm and to cook food. But controlled use of fire began only about 7,000 years ago. Now fires are associated with disasters like burning buildings and wildfires; and, not to miss, its connection with chemistry, climatology and botany. Scott answers hitherto unknown facts—the puzzle of ants in the Amazon rainforest provide a firebreak against surface fires.

DOWNTONEARTH.ORG.In 10-20 SEPTEMBER 2020 DOWN TO EARTH 47
ETCHED IN FOSSIL

Mass extinctions are very important to how life evolved on Earth. For example, when an asteroid hit the Earth 66 million years ago, the resulting dinosaur extinction led mammals to take their place. My colleagues and I have published new research on the mass extinction that took place 359 million years ago at the boundary between the Devonian and Carboniferous geological periods. There have been many previous speculations as to the cause of this event, including volcanic eruptions, asteroid impacts, climate change, sea level changes, wildfires and the rise of the first forests.

But we have shown that the extinctions on land at this time may have been caused by a catastrophic thinning of the ozone layer that led to increasing levels of ultraviolet radiation. Something similar contributed to the mass extinctions at the end of the Permian and Triassic periods, but these events were caused by volcanic eruptions. Our research suggests the Earth has a natural internal process triggered by a warming climate that can destroy the ozone layer, a serious warning for our own period of climate change.

The Late Devonian extinction
played a significant role in the development of vertebrate life. It included the loss of the dominant group of armoured freshwater fish. The survivors were the sharks and the rather minor group of bony fish that subsequently spread out to dominate our younger oceans.

The event also shaped our own evolution because it led to the extinction of the first four-legged "tetrapods". These were "fish" whose fins had evolved to become limbs with between six and eight fingers and toes. The first land-dwelling tetrapods with five fingers and toes—our ancestors—don't appear in the fossil record until after this extinction.

To find out exactly what caused the Late Devonian extinction, we looked for evidence of what happened in the atmosphere that was captured by fossilised plants from before and after the event. In particular, we looked at the resistant walls of the microscopic remains of pollen and spores, taken from fossils found in East Greenland and released by dissolving the rock samples in acid.

The resistant walls of spores and pollen are there to protect the cell contents from ultraviolet radiation. But there is a brief interval between the creation of a new cell and the formation of its protective wall when it is vulnerable.

The kinds of spores we examined are covered in small spines that are normally identical in length and have perfectly pointed tips. But most of the spines in our samples were malformed in a wild variety of shapes, suggesting the tips of their cells was damaged by ultraviolet radiation. This suggests that the Earth's protective ozone shield was down as the spores were formed.

Other spores and pollen had pigmented walls that acted as a protective tan, enabling those plants to survive. But a number of important plant groups quickly became extinct and the forest ecosystem collapsed. These groups that survived were still disrupted and it took several million years to rebuild, creating quite a different ecosystem in the process.

Our samples came from a very large ancient lake that existed all year round despite being in a very arid part of the world. Such lakes only form when glaciers collapse and the world's seasonal monsoon is very active due to solar heat, so the global climate must have been in a warming period.

**EXTINCTION MECHANISM**

Other scientists have shown that high summer temperatures over continental areas can increase the transport of water vapour high into the atmosphere. This water vapour carries with it organic carbon compounds that include chlorine, which are produced naturally by a wide variety of plants, algae and fungi. Once these compounds are near the ozone layer, they release the chlorine, and this breaks down ozone molecules. This produces a positive feedback loop because a collapsing terrestrial ecosystem will release a flush of nutrients into the oceans, which can cause a rapid increase in algae. So the more the ozone layer is damaged, the more plants die, and the more ozone-damaging compounds are released.

Later on, the ozone layer will naturally recover as the climate cools and the algae help remove carbon dioxide from the atmosphere.

The discovery of this potential new extinction mechanism indicates that a warming climate, such as we have now, has the potential to erode the ozone layer to let in damaging ultraviolet radiation. This has consequences for all life on Earth, both on the land and in shallow waters.

We believe it is as important as recognising that asteroid impacts caused mass extinctions. Once we knew about the consequences of asteroid impacts, there followed an intense collective research effort to assess the threat. We now plot the paths of all large extraterrestrial objects likely to come close to the Earth's orbit.

Similarly, we now need to focus effort on understanding the links between global warming and the production and atmospheric transport of chlorine-bearing carbon compounds that have the potential to cause similar destruction of our ozone layer. We need to also study rocks with malformed spores to work out the duration of the extinction and the likely rate of temperature change required to push enough ozone-destroying chemicals high into the atmosphere. We need to do ultraviolet-malformation experiments on living fern-like plants which have spiny spores.

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*John Marshall is professor of Earth Science, University of Southampton, the UK. By special arrangement with The Conversation*
No hand to lend

WHY SMALL, MARGINAL AND LANDLESS FARMER HOUSEHOLDS—WHO ACCOUNT FOR 86 PER CENT OF INDIA’S RURAL HOUSEHOLDS AND OWN 48 PER CENT OF AGRICULTURAL LAND IN SEMI-ARID HEARTLANDS—ARE FAILING TO GET BOTH FORMAL AND INFORMAL CREDIT

SUMEDHA SHUKLA & GAURAV ARORA

ABOUT 69 per cent of India’s population resides in rural areas, with agriculture being the primary income source. In 2017, the Committee on Doubling Farmers’ Income observed that rural income levels have either remained stagnant or worsened. On an average, the difference between the rural inflation rate—as measured by consumer price index—and the growth rate of agricultural wages was merely 2 per cent since 2000. Between 2012 and 2017, the monthly income of an average agricultural household was less than Rs 8,000, increasing annually by 9.5 per cent as against the inflation rate of 7.5 per cent, implying that almost 80 per cent of growth in incomes was consumed
As a result, political and policy spheres have increasingly called for interventions to enable higher farm incomes. Low and fluctuating farm incomes in India are a natural corollary of plateauing crop yields (output per hectare) since the 1980s, and, farm-level risks vis-à-vis crop losses (or output reduction) due to weather variation, pest infestation, animal attacks and crop price volatility.

The three main policy instruments to manage farm risks are farm loans or agricultural credit, crop insurance, and the Minimum Support Prices (MSP). While credit and insurance are meant to mitigate production risks—where they serve as safety nets for household consumption and so-farm investment in the event of crop losses—MSP serves to sustain farm revenue against fall in crop prices.

We investigated the utility of farm credit—and more specifically the formal creditors such as rural banks relative to the informal moneylenders or andheras—as a policy tool to mitigate farm production risks. In India, the formal rural credit is compulsorily tied to insurance—the loanee farmer must also buy crop insurance for the growing-season in which the loan is sanctioned. This property of formal credit should have ideally enhanced its value-proposition relative to informal sources.

However, multiple impediments exist in the formal credit system pertaining to weak institutions that lead to, what economists call, high transactions costs. These transaction costs manifest as delays in credit delivery and institutional bias in loan approvals—skewed in favour of the wealthier farmers or larger land holders—which induce farmers’ reliance on the informal credit sector, especially during immediate cash need in times of farm distress.

INEFFECTIVE DELIVERY

We provide a historical account of the evolution of agricultural credit in India, and fresh empirical evidence on unequal credit access in semi-arid regions. Overall, our study highlights the systemic and persistent inadequacy that renders the formal farm risk management mechanisms ineffective, especially for the most vulnerable sections of the farming society.

The role of credit in risk mitigation and improving agricultural productivity is well-established. While short-term loans are generally used for timely purchase of farm inputs such as fertilisers and pesticides that enable higher crop yields; medium-term and long-term credit can facilitate the creation of farm assets by funding infrastructural investments. The Committee on Doubling Farmers’ Income observed that nearly 86 per cent of all farm investment is undertaken using borrowed funds.

This critical role of credit was first recognised by the colonial government who disbursed short-term loans during the drought years of mid-1870s. In 1904, the Cooperative Societies Act formalised the role of cooperatives, followed by the legal recognition of credit societies in 1912, in disbursing agricultural credit. However, low repayment levels—about 70 per cent over due in 1927—warranted additional intervention. In 1935, with the establishment of the Reserve Bank of India (RBI), a dedicated division was set up to govern matters of rural financing, and efforts were made to enhance institutional credit penetration via banks in rural areas. However, only 7.2 per
cent farmers had access to some form of institutional credit until 1951, says KR.

The institutional inadequacy in terms of access and size of loans continued to be a challenge throughout the 1950s and 1960s, which came into sharp focus during the Bihar drought of 1965-67, leading to the first wave of bank nationalisation in 1969, when agriculture was designated as a priority sector and a fixed proportion of total bank lending was mandated towards the agricultural sector.

Yet, the agricultural credit flow did not show much improvement because commercial banks were not in tune with the needs of small farmers who offered little in terms of collateral. Moreover, the lack of credit history among rural borrowers was deemed highly risky by the lenders.

On the other hand, cooperatives or micro-lending organisations, which were more amenable to provide loans to small farmers, lacked funds to meet the sector’s credit demand. With little government support, these organisations, inevitably, relied on pre-existing social networks and farmer wealth, further deepening the social and economic inequality in rural credit access.

Eventually, the regional rural banks (RRBs) were established in 1969 as an alternative banking structure that combined the strength of cooperatives and those of commercial banks, which was followed by a second wave of bank nationalisation and the creation of the National Bank for Agriculture and Rural Development (NABARD) in 1982. NABARD played a crucial role to promote institutional rural credit via self-help groups (SHGs).

Cumulatively, these efforts led to a significant improvement in the expansion of formal credit in the agricultural sector. But this plateaued out post-1991.

The inequality in access among farmers and the erosion of lenders’ profits challenged the sustainability of the institutional credit delivery system. The reforms of 1991 introduced the deregulation of interest rates, recapitalisation of select banks, and higher refinancing support from the RBI. Over the years, the government launched many farm credit programmes, including the Kisan Credit Cards (KCC) in 1998–1999, Interest Subvention Scheme in 2006–07 and the Pradhan Mantri Kisan Samman Nidhi Yojana in 2018, that attempted to provide zero interest loans via direct benefit transfers to farmers who owned up to 0.8 hectares of land.

Despite these efforts, institutional credit penetration remains low. Recently, NABARD’s All India Rural Financial Inclusion Survey (2016–17) showed a direct relationship between asset holdings and formal credit access—the percentage of households who accessed formal credit increases among higher income deciles. Thus, not only is institutional credit access limited, but it is also skewed away from the poorer sections of the farming community who need it the most.

We studied a range of social and economic factors that drive credit access among 927 formal and 354 informal credit-taking rural households in semi-arid states of undeclared Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh and Maharashtra during 2001–2014. The data was part of a primary survey conducted under the Village Dynamic Studies for South Asia and coordinated by the International Crops Research Institute for the Semi-Arid Tropics. We modelled credit access as a function of three sets of variables representing credit worthiness of the household—land ownership status, household demographics and asset holdings.

The results were significant. We found farmers who owned land are 1.4 (and 1.2) times more likely to access formal (and informal) credit relative to landless farmers. Every additional piece of land owned...
further increased the odds of accessing credit by 1.2 times. Therefore, small, marginal and landless (SML) farmer households who account for about 86 per cent of the total rural households and own less than 48 per cent of agricultural land in India’s semi-arid heartlands lose out in terms of attaining both formal and informal credit. In fact, a 2010 report by the USDA showed that only 40 per cent of such households had access to some form of institutional credit. We also discovered that soil quality too had a major impact on the odds of gaining credit access—erosive soils reduced credit access by six times, as compared to healthy soils.

Our results also corroborate the enduring role of social hierarchies as predictors of credit access by the means of caste, education, age and wealth. Households of the forward castes are 1.3 times more likely to get farm credit from formal and informal sources when compared to their counterparts from the backward castes. The agricultural census of 2012 also showed that scheduled caste and scheduled tribe households account for more than 29 per cent of landholdings in the country, yet received less than 12 per cent loans under the KCC scheme. Wealthier households, and households having older and more educated heads, are more likely to get credit, possibly due to access to better social and economic networks. We also found evidence of significant differential access across states. On average, wealthier southern states exhibited higher credit access as compared to the western states.

Our results reveal the inability of the formal agricultural credit sector in achieving its primary objective of disrupting social and economic barriers to credit access. The problem is further compounded because credit and insurance are compulsorily bundled and 95 per cent of crop insurance holders also avail formal credit implying similar access inequalities in India’s crop insurance sector.

A DEEPENING CRISIS

The vulnerability of India’s agricultural institutions and the existing policies have, perhaps, never been starker as it is today. The outbreak of COVID-19 and the consequent lockdown measures have hit the agriculture sector in an adverse manner. The timing of the COVID-19 lockdowns coincided with the harvest season of the rabi crop season. This exposed the sector to delays in the harvesting cycle, which, coupled with the lack of storage facilities, led to post-harvest crop failure for many. In areas where the produce was harvested on time, farmers found themselves scrambling to sell their produce and were likely left to the whims of the traders with no guarantee of appropriate remunerations. So, despite having a bountiful crop, farm incomes were still stressed.

In May 2020, in yet another policy shift, the Union cabinet decided to scrap the compulsory linkage between insurance and institutional credit. Unless such policy interventions account for measures to improve crop insurance access for non-farmer farmers, the systemic inequality in credit access will only reflect in insurance adoption in the coming years. Developing affordable and effective risk management systems that are accessible to all farmers, irrespective of social and economic status, is the need of the hour.  

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@downtothirda
A TRASHED VALLEY

Despite clear regulations and court interventions, local governments continue to ignore Kashmir’s municipal solid waste crisis

Raja Muzaffar Bhat

The daily garbage generated by Mafiz Khan, a dentist in Srinagar, and his family of six can fit inside a regular disposable paper cup. This has been possible because the family segregates its garbage and composes the organic kitchen waste in a pit constructed in their kitchen garden. Before they introduced this simple tweak in their lifestyle over a year back, they generated nearly 3 kg of unusable mixed waste every day. A similar routine is followed by Muqtaaz Bashir, and his family in Budgam district, who believes in-house composting is the only sustainable solution to the mounting garbage problem in the Valley.

Like them, many families across Kashmir districts are being put to test in in-house composting because local governments here over the past decades only aggravated the garbage problem in the absence of proper waste management.
practices, local municipal bodies have resorted to several illegal practices, most glaring of which is the rampant dumping of untreated waste in waterbodies including rivers, lakes and wetlands across the Valley (see ‘Wetlands turn dumpyards’).

A UNIQUE CHALLENGE
Kashmir has limited usable land due to its mountainous terrain and almost all of it is extremely fertile because of the wide network of rivers and lakes. Even the non-irrigated land on mountains and barren, stony, hilly land landscape in nature) are suitable for agriculture due to ample rainfall. At the same time, the Valley, which accounts for the bulk of the fertile land, has witnessed tremendous urbanisation in the recent past. Srinagar is one of the 100 fastest urbanising cities in the world with an annual growth rate of 2.5 per cent. So, not only is finding land for dumpsite extremely difficult, waste generation is also increasing rapidly.

This explains why for the past 10 years the Srinagar Municipal Corporation has been unable to acquire 20 hectares for creating an alternate landfill site as the existing site at Acham is already overflowing. In 2017, the then deputy chief minister Nirmal Singh had announced a committee headed by deputy commissioner of Srinagar to hunt suitable land. After failing to find land within the city, they unsuccessfully tried the neighbour Sugam district, but people staged strong protests there.

The Sopore Municipal Council in Baramulla district has been on the look-out for a landfill site for the past 10 years. During the lockdown, they started illegally dumping waste in Ningeo wetlands along the Wular lake, one of the three Umbrella Ramsar sites in the Union Territory (more on this later). The Bandipora Municipal Council has also adopted a similar practice as they are dumping waste in Zalwan region located on the eastern bank of Wular lake.

LITTLE RECURSE
In March 2018, I filed a petition before the National Green Tribunal (NGT) on the mindless dumping of
waste across the Wular lake, Ho-
kasar wetland and Doodh Ganga
river. In April 2019, NITJ sought a
report from the state government.
In response, the Kashmir division-
al commissioner last December told
the tribunal that no municipal solid
waste would be dumped in wet-
lands or water bodies. It also issued
a notice to all departments to in-
crease vigil against such waste
dumping and suggested a host of
other measures including erection
of sign boards. We now know that
despite the state directives little
has changed on ground.
This World Environment Day on
June 5, I had mailed an article to
NITJ showing that Sopore Municipal
Committee had taken advantage of
the lockdown and illegally set up a
dumping site in Ningbroo wetlands,
west of Wular lake. The site is not
only a wetland but also a demar-
cated forest area. It even has a
nursery by the Water and Soil Con-
servation Department and is being
developed as an eco-tourism zone.
On July 8, NITJ took cognizance of
my article and issued a notice to the
deputy commissioner of Baramulla,
State Pollution Control Board and
member secretary of State Wet-
lands Authority to respond by Octo-
ber. Surprising enough, Jammu
and Kashmir does not yet have a
State Wetlands Authority.

Meanwhile, residents of Ningli
Tarzoo village near Sopore town
moved the Jammu and Kashmir
High Court seeking immediate clo-
sure of the illegal garbage dump-
site. The division bench on July 10
sought a status report from the gov-
ernment on the allegations. On July
15, the bench suggested the court
might have to visit the site to know
the truth after the municipal coun-
cil alleged no dumping had taken
place. A day later, the municipal
council employed more than 150 la-
bourers along with cons to earth fill
the illegal dumping site. Since then,
the municipal council continues to
dump untreated garbage and then
covers it up with soil. On September
1, the chief justice of Jammu and
Kashmir High Court, who is part of
the bench, ordered she will be visit-
ing the illegal site and get the land
up to see whether the municipal
council is staging a cover-up.

Municipals are local govern-
ments responsible for protecting
the environment, but in Kashmir
they are involved in its destruc-
tion. The crisis is not limited to
urban bodies, rural areas are also
struggling due to poor waste
management. Local residents and
sanitation workers also dump
waste in waterbodies.

It is unfortunate how despite
scarcity of land, the local govern-
ments are aimlessly hunting new
areas and willing to resort to illegal
practices for the same. They should
instead turn to the Municipal
Solid Waste Rules, 2016, which
consists on segregation at source and
decentralised composting. This is
easily possible in the Valley as
nearly 80 per cent all house own
open spaces, but it needs a govern-
ment push.

For the revival of the wetlands, I
had suggested in the 2019 NITJ case a
cooperation between the wildlife
conservation department, which is
responsible for wetlands, and the
rural sanitation department, the
nodal agency for Swach Bharat
Gromin, a programme whose bud-
get has remained largely unspent
in the past five years. On August
27, the NITJ has directed the state
government to look into the feasibil-
ity of the suggestion. (Raja
Musaffar Bhat is a Srinagar-
based activist and columnist. He is
an Anvam India Fellow)
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A paradox like no other

In recent times, agriculture made headlines for all the wrong reasons—farmers quitting cultivation or a perennial loss-making enterprise. The sector's fast-declining economic importance reached such an extent that economists suggested India had already turned into a non-agrarian economy. But two headlines in the first half of September should force us to revise our perspective. First, when India recorded a contraction of 23.9 per cent in Q1 in the first quarter (April-June, 2020), agriculture emerged as the unbelievable winner with 3.4 per cent growth. This growth was based on the rabi (or winter) crops which in any case is a bumper one. Second, the kharif (or the monsoon) crop was already an exceptional one in hectare (acreage) terms. It broke a four-year record with 109.5 million hectares (ha) under sowing.

Now, the tough question: how much would farmers earn out of this? Usually, crop output value is used as a proxy for income of farmers. But in recent years, we have witnessed no correlation between crop output and income of farmers. For instance, take the situation in 2016-17 when India had record hectarage that was surpassed this kharif season. Crop value output grew 5.9 per cent faster than in recent years. But according to the National Account Statistics released recently, 2016-17 did not register real growth in farmers' income.

Let us now look at the Wholesale Price Index (WPI) for agriculture, which indicates the price at which farmers sell their produce—an indicator of how much they can earn. The higher it is, more is the income for farmers. But in the first quarter this year, the WPI for food articles was 2.1 per cent. It was 7 per cent in the first quarter of last year. That means farmers did not get a good return from their bumper rabi crops. Does this mean the same for the kharif season?

The answer would be “Yes”, but for other reasons. The harvest will be a bumper one, but the government is already distributing free foodgrains from its overflowing reserves as part of its Covid-19 relief package. This will immediately lead to a glut in the market; farmers will have to sell their produce at a reduced price. On the other hand, there may not be a huge demand for foodgrains as due to loss in income caused by the pandemic, there is reduced purchasing power in general. This will lead to fall in food prices. Ultimately, farmers will not earn proportionate to their production or matching agricultural growth.

As such, a farmer’s share in consumer’s expenditure on food items is very low; sometimes as low as 20 per cent in the case of fruits and vegetables. Official data may point out an increase in the income of farmers due to a steep decline in the number of cultivators—from 167 million in 2004-05 to 146 million in 2011-12. The growth in farm income/cultivator between 2004-05 and 2011-12 was not due to a rise in real income, but due to a steep decline in the number of cultivators—from 167 million in 2004-05 to 146 million in 2011-12.

A potential loss in the kharif season is an ominous sign for farmers. Farmers earn the maximum from the kharif season as compared to the rabi season. The income from kharif crop is invested in rabi crops. So, less income in kharif means less investment in rabi. And if they don’t get returns from their investments, it adds to their debt. That’s because farmers source up to 50 per cent of their investment from borrowing. In Andhra Pradesh, Maharashtra and Madhya Pradesh, it goes up to 90 per cent. Farmers who made possible this exceptional season amid a pandemic now face the triple whammy: threat of not being able to sell their produce, risk of low returns, and, a mounting debt. As income from non-farm sources like daily wages are now uncertain, this makes it a lethal year despite the bumper harvest.
ONLINE GLOBAL TRAINING PROGRAMME

FAECAL SLUDGE MANAGEMENT IN RURAL AREAS

COURSE Duration: 15 Hours (2 weeks) between 30 October and 12 November 2020
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BACKGROUND
Will construction of toilets in numbers end our quest for sanitation soon? Certainly not. Countries across the globe will now have to wake up to the fresh challenge of disposal of the massive quantities of solid and liquid waste generated by the new toilets they have built.

This waste can easily turn into a health hazard by seeping into our groundwater and other water bodies like lakes and rivers. The challenge is intensified in rural areas, where on-site containment is the only solution. Out of the box thinking on safe containment and management is vital in such areas.

The 2010 Joint Monitoring Progress report flags issues of safely managed sanitation services, stressing the need for management of excreta throughout the sanitation chain, from hygienic toilets, containment and emptying, to conveyance, treatment and, most importantly, reuse.

ABOUT THE TRAINING PROGRAMME
CSE is organizing a training programme on key topics of faecal sludge management in rural areas. The course comprises of material compiled from years of CSE’s work in the field for self-study, and learning tools such as presentations, audios and videos, all featuring the most relevant case studies. The training will provide online forums for discussion. Quizzes and assignments will also be part of this programme. There will be two one-hour long five sessions with experts, one each week. Training modules in Hindi will also be introduced.

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