



Slippery slopes

To face heavy monsoons, States must preserve the integrity of rivers and mountains

Even as the Southwest monsoon retreats along parts of northern Karnataka, Telangana, Odisha, Bengal and the northeastern States in October, it is leaving a trail of destruction in several districts. Significant loss of life has occurred in Kerala. While the heaviest recent downpour has been reported from west Madhya Pradesh, Odisha, east Rajasthan and Uttarakhanda, with as much as 31 cm in Sheopor on Monday, there has been very heavy rain in Kerala and Gangetic West Bengal. The Indian monsoon is an invaluable resource that sustains hundreds of millions of people, but variations in its patterns and intensity pose a rising challenge. Kerala, which hosts a vast stretch of the Western Ghats, is having to contend with these changes with almost no respite between severe spells. The recurrent bursts show that anomalies in precipitation over the State, spectacularly demonstrated by the inundation of idyllic towns in 2018 and by mudslides that killed many a year later, require a comprehensive adaptation plan. This year's torrential rain in the State, which has killed at least 35 people so far, is causing alarm as large reservoirs in mountainous reaches start filling up fast, while the Northeast monsoon lies ahead. The Government has responded by issuing alerts for several dams, including Idukki, and put in place plans to release water to avoid a repeat of the flooding witnessed three years ago. Significantly, the IMD has issued an alert for more heavy rainfall in Kerala from October 20.

The precariousness of living conditions in much of the country make the annual monsoon a persistent threat for millions, and governments should do more to reduce the risk to life and property. Nurturing the health of rivers and keeping them free of encroachments, protecting the integrity of mountain slopes by ending mining, deforestation and incompatible construction hold the key. The ecological imperative should be clear to Kerala with successive years of devastation, echoing the warnings in the Madhav Gadgil committee report on the Western Ghats. Land may be an extremely scarce resource, but expanding extractive economic activity to montane forests is certain to cause incalculable losses. One estimate by researchers in 2017 put quarrying area in Kerala at over 7,157 hectares, much of it in central districts that were hit later by mudslides. It should be evident to governments that it is unconscionable to allow the pursuit of short-term profits at the cost of helpless communities. A more benign development policy should treat nature as an asset, and not an impediment. Accurately mapped hazard zones should inform all decisions. There is a similar threat from extreme weather, breaking glaciers and cloudbursts to Uttarakhand and Himachal Pradesh. Several States face climate change impacts and extreme weather, and the response must be to strengthen natural defences.

Greenfield hopes

The rebound in investments past pre-pandemic levels must be nurtured

The ebbing of the second wave of the pandemic, accompanied by the gradual lifting of restrictions across States, have not only spurred an improvement in several economic indicators but also led to a much-awaited investment revival. Data from investment monitoring firm Projects Today reveal that investment commitments and indicators of actual capital expenditure on the ground recorded a more than robust sequential growth in the July-September quarter after an insipid Q1. Even though enhanced central government infrastructure spending is partly responsible, this uptick is surprising for another reason – the first half of 2021-22 has now seen fresh investments higher than the pre-COVID year of 2019-20, with private capital outlays up nearly 49% to ₹4.87-lakh crore. Whether or not this growth rate is sustained, the implementation of the “PLI” scheme to promote manufacturing investments in India is expected to spur more investments in textiles, pharma, electronics over the second half of this year and 2022-23. Critics may call it a retro-style import substitution push, but if it manages to nudge a few investments away from Vietnam, Cambodia and now, Bangladesh, at a time the world is looking to reduce its China dependence, this is worth the effort. Initial evidence suggests some investors have been converted.

Speedy implementation is, however, essential to ensure the expected gains accrue – of the 13 sectors for which PLIs have been announced, nine have been notified so far, and the others must be spelt out quickly lest global investors pick another destination. The handing over of Air India to the Tata group – the first outright sale of a public sector firm in almost two decades – will ring in some much-needed confidence in the Government's much-reiterated stance that it has no business to be in business. With its efforts to repair some of the damage to the long-bleeding telecom sector and finally fix the festering folly of pursuing retrospective tax cases that it had termed as ‘tax terrorism’ while in the Opposition, the Government has been making the right noises. These decisions still have to be taken to their respective logical conclusions swiftly, for an enduring shift in perceptions, and outcomes on the ground. Moreover, as it seeks to seal economic partnership pacts or scale up ties with key markets like the EU, the U.S. and the U.K., India needs to also invest some of this energy into improving its image on key socio-economic parameters and the adherence to the ‘rule of law’ while refraining from fresh mistakes and heavy-handed regulations like the much-opposed draft norms for e-commerce. In a world where capital is increasingly influenced by environmental, social and governance standards, these factors merit more policy attention as well.

Over-simplified models, complex social systems

Along with fundamental epistemic limitations, western scientific methods are showing up ethical weaknesses too



ARUN MAIRA

The 2021 Nobel Prize for Physics has been shared by three physicists (with one half jointly to Syukuro Manabe and Klaus Hasselmann) “for the physical modelling of Earth’s climate, quantifying variability and reliably predicting global warming” and (and the other half to Giorgio Parisi) “for the discovery of the interplay of disorder and fluctuations in physical systems from atomic to planetary scales”, according to the citation by the Nobel selection committee.

Nod for modelling methods

The 2021 Nobel Prize in Economics (or the The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2021) was awarded to David Card, for proving that rises in minimum wages increase employment levels (and improve overall societal well-being), contrary to the views of most mainstream economists that because higher wages increase firms’ costs, the well-being of firms (and societies) will be harmed. The other half of the Economics Nobel went to Joshua D. Angrist and Guido W. Imbens for improving economists’ tools for understanding complex systems, which were tools David Card had also used. Thus, the Physics and Economics Nobel prizes were for contributions to methods of modelling complex systems (apart from the half in economics for insights into wages and labour markets using new methods in economics).

A quarter century ago, Nobel laureates in economics, Kenneth J. Arrow and Brian Arthur, had arranged a meeting, at the Santa Fe

Institute, of economists with physicists including Nobel Laureates, Murray Gell-Mann and Philip Anderson, to understand what economists can learn from physicists about the formulation of theories and models. The economists presented their models.

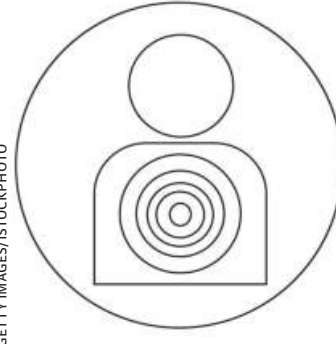
M. Mitchell Waldrop gives an account of the meeting in his book, *Complexity: The Emerging Science at the Edge of Order and Chaos*.

“And indeed, as the axioms and theorems and proofs marched across the overhead projector screen, the physicists could only be awe-struck at their counterparts’ mathematical prowess – awe-struck and appalled. It seemed as if though they were dazzling themselves with fancy mathematics, until they couldn’t see the forest for the trees. They weren’t looking at what the models were for, and whether the underlying assumptions were any good. In a lot of cases, what was required was just common sense.”

Realised a long while ago

Physicists had realised the limitations of human minds to understand how the world really works a century ago. The Nobel Prizes in Physics were awarded to Max Planck (1918), Albert Einstein (1921), Niels Bohr (1922), Louis de Broglie (1929) and Werner Heisenberg (1932). They displaced the Newtonian paradigm of physics, which had reigned for three centuries, which saw Nature as a machine that could be described with linear theories of cause-and-effect. The essence of the new physics was that reality is not what it seems to be to the rational mind. More startling was the conclusion that the human mind can never know what reality is because it is limited to models that can satisfy only its internal logic.

The science of economics lags physics by a century. Economists continue to model economics as machines whose efficiency can be increased by managing inputs to



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produce more outputs, thus also increasing the overall sizes of economies. The saving grace for physicists is that they attempt to model only the physics of the universe, as the winners of the 2021 Prize have done. Whereas economists try to develop rigorous mathematical proofs of social phenomena. Now, some economists are reluctantly accepting that economies are affected by fuzzy human and societal irrationalities. Recently, some have won Nobel Prizes for (finally) including emotions and concepts of ‘identity’ into their models. Which common sense alone should have revealed to them long ago.

Nature’s workings, humans

Systems’ sciences have advanced since the seminal meeting at the Santa Fe Institute in 1987. Engineers design machines, applying the laws of mechanics, to produce greater outputs with lesser inputs. Similarly, 20th century economists have been attempting to design more efficient economies, looking for levers to pull within them, such as prices of money and carbon, to improve their performance. Now they are beginning to look at Nature with greater respect, to understand how Nature designs itself. Nature is an adaptive system that produces innovations from within itself, such as new species. And species too adapt their abilities as Nature around them changes. *Homo sapiens* is the most complicated of all

species because, unlike other species, it has intentions to master Nature, not just adapt to it. With human agency come complications of egos and ethics. Humans want to have power over Nature and over other humans too. Even when their actions are well-intended, they are ill-informed because they do not comprehend the power of the system of which they are only small parts, which the paradigm-changing physicists of the 20th century had realised.

A flawed construct

The harm that measurements derived from over-simplified models can cause to the health of complex self-adaptive social systems has become evident with the recent imbroglio of the World Bank’s Ease of Doing Business Framework. The intentions of the measurer will determine what is measured. Stock market indices, ease of doing business, and profits of firms are measures of what financial investors are looking for. Whereas levels of incomes at the bottom of the pyramid, and equity in ease of living for all human beings are better indicators of the health of a society and its economy. GDP is an indicator of the material performance of an economy; not its social and environmental health.

According to the paradigm-changing physicists of the early 20th century, the “logical”, linear, way of thinking is only a construct of the human mind. Nevertheless, economists (and even some physicists) persist in thinking that there must be causal, linear relationships amongst all variables in a system. New statistical methods (like Angrist and Imbens’) apparently enable causation to be separated from mere correlation. Jordan Ellenberg explains, in *How Not to be Wrong: The Power of Mathematical Thinking*, how mathematical methods can reveal hidden structures beneath the messy and chaotic structures of our daily lives. He warns: “Mathematics is a

way not to be wrong. There is a real danger that, by strengthening our abilities to analyse some questions mathematically, we acquire a general confidence in our beliefs, which extends unjustifiably to those things we’re still wrong about.”

Too little listening now

Along with fundamental epistemic limitations, western scientific methods are revealing ethical weaknesses too. The dignity of human beings is squeezed out to convert humans into quantities to fit into economists and social scientists’ mathematical equations. Scientists arrogantly claim they know best what is good for everybody; and that their views must prevail because they are more ‘rational’. There is too much mathematical calculation in the world of modern scientists; too little listening to people not like themselves.

We have the dialogue series, *The Limits of Thought* (1998), by David Bohm (who was nominated for the Nobel Prize in physics) and Jiddu Krishnamurthy, the Indian philosopher. Scientific models of the climate as a physical system only in which economists can determine a price of carbon that will make the world alright again are fundamentally flawed. Bohm had said that the end of science means the coming of western civilisation, in its own time and in its own way, into the higher dimensions of human experience. Those higher dimensions include humility within the world that has created the human mind, and which humans cannot logically explain.

The time has come for more equity in global governance, and for an “Eastern” philosophical way of thinking to save the world from a scientific apocalypse.

Arun Maira is the author of “Transforming Systems: Why the World Needs a New Ethical Toolkit”. He is also a former Member of the Planning Commission

The nuclear proliferator who was never indicted

America’s shielding of A.Q. Khan paralleled its policy of not penalising the Pakistani military’s nexus with terror groups



BRAHMA CHELLANEY

One key question is unlikely to go away despite the passing of A.Q. Khan, the world’s biggest nuclear proliferator, who developed COVID-19 complications. Why did the United States never indict this Dutch-trained Pakistani metallurgist for stealing western nuclear secrets and operating an illicit international nuclear-smuggling network for more than a quarter of a century? After all, the U.S. has indicted lesser known individuals, including as recently as last year, for conspiring to smuggle nuclear goods to Pakistan.

The beginnings

Khan began his nuclear smuggling in the mid-1970s while working in the Netherlands as an engineer at Urenco, a European consortium, where he furtively accessed blueprints of centrifuges for enriching uranium. With the help of the designs he stole and the nuclear components and materials he procured illicitly from Europe and North America, Khan played a central role in Pakistan’s nuclear-weapons development, although China’s covert assistance was critical to its ultimate success.

Until Pakistan’s 1998 nuclear tests, Khan focused on smuggling western nuclear goods to his country. Thereafter, Pakistan’s nuclear czar established a nuclear super-market, selling starter kits and components to countries the U.S.

considered rogue states – Iran, Libya and North Korea.

Yet, the U.S. never indicted Khan. Why the world’s nuclear non-proliferation leader did not indict the top global nuclear-smuggling kingpin is an issue that has not even been examined.

The Lubbers revelations

Former Dutch Prime Minister Rutud Lubbers revealed in 2005 that the Netherlands sought to arrest Khan in 1975 and then again in 1986 but that on each occasion, the Central Intelligence Agency (CIA) advised his country to back off. With Dutch authorities deferring to U.S. intelligence, Khan was allowed to return to the Netherlands repeatedly, with his last visit being in 1992.

In fact, after Khan was tried in absentia and sentenced to four years in prison in 1983 for stealing secret blueprints, the Amsterdam court lost his legal files, with the main judge suspecting the CIA’s hand in the disappearance. In 1985, Khan’s sentence was overturned on a technicality – he had not been served the summons. Instead of seeking a retrial, authorities abandoned prosecuting the most momentous crime committed in the Netherlands since the Second World War.

As Lubbers said, “The last word is Washington. There is no doubt they knew everything, heard everything.” So, why did the U.S. protect Khan? Probably the same reason why Washington ignored mounting evidence of Pakistan’s nuclear-weapons advances. As *The New York Times* reported in 1998 that “without China’s help, Pakistan’s bomb would not exist”, but that the U.S. “pursued policies that proved almost as essential to



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the Pakistani bomb program” as the Chinese assistance.

In the 1980s, while Khan’s network was smuggling western nuclear items to Pakistan, the CIA was smuggling billions of dollars of weapons to anti-Soviet guerrillas in Afghanistan via Pakistan. Add to the picture another Cold War dimension that Lubbers alluded to: New Delhi’s warm ties with Moscow and the 1974 nuclear test induced the U.S. to turn a blind eye to Pakistani proliferation to help balance India.

A role switch

The U.S.’s concerns were stirred only after Pakistan’s 1998 nuclear tests, which emboldened Khan’s metamorphosis from a buyer to a seller. After Iran and Libya later admitted receiving nuclear items from Pakistan-linked black marketers, U.S. pressure compelled Pakistan to open investigations into Khan’s activities.

What followed was a remarkable charade. In a state-scripted confession, Khan appeared on national television in 2004 asking for forgiveness, saying he had acted entirely on his own in transferring nuclear goods to other countries. Pakistani dictator General Pervez Musharraf then quickly pardoned Khan. But to prevent the uncovering of the military’s own role in the nuclear-smuggling scandal, Mush-

arraf also barred international investigators from questioning Khan.

Before long, the charade started unravelling. Khan disowned his confession, saying it had been forced upon him by Musharraf, while the Islamabad High Court ruled his house detention unlawful. Khan lived the rest of his life in his comfortable Islamabad villa, with state-provided security.

Yet, the U.S. readily acquiesced in the charade from the beginning, despite knowing well that Khan could not have operated alone in a country that has always been in the grip of its military. British investigative journalists Adrian Levy and Catherine Scott-Clark, in their book on the scandal, concluded that Khan’s underground trade was “supervised by Pakistan’s ruling military clique”. Musharraf himself, according to French intellectual Bernard Henri Lévy, was in the know of “Khan’s dark machinations”.

The North Korean link

In exchange for supplying centrifuges to Pyongyang, Pakistan received North Korean ballistic missile technology, helping it to build its first intermediate-range, nuclear-capable missile, Ghauri. North Korea’s nuclear-weapons capability, however, relies not on enriched uranium but on plutonium, which the Khan network did not traffic. Iran apparently received second-hand gear – discarded Pakistani centrifuges, some with traces of enriched uranium. Libya was sold basic kits, from ageing centrifuges to natural uranium.

As Pakistan’s Kahuta facility advanced from entry-level P-1 aluminium centrifuges to P-2 maraging-

steel centrifuges – which could spin almost twice faster, thus doubling the rate of uranium enrichment – Khan’s network palmed off the old centrifuges on other nations. However, until Khan’s very last breath, Pakistan’s military generals ensured that no outside investigator questioned him.

The law of consequences

Against this background, America’s shielding of Khan, who long championed a “Muslim bomb”, paralleled its policy of not penalising the Pakistani military’s nexus with terrorist groups, thus leading to unforeseen but far-reaching consequences. Such dual shielding paved the way for Pakistan’s emergence as the world’s sole state sponsor of Islamist terrorism protected by nuclear weapons.

Today, the U.S. maintains contingency plans to seize Pakistan’s nuclear weapons if they risk falling into terrorist hands. Such a threat, however, comes from jihadists within Pakistan’s military and nuclear establishment. The U.S. has added Iran’s Islamic Revolutionary Guard Corps to its list of foreign terrorist organisations but not Pakistan’s rogue Inter-Services Intelligence, with which the CIA has sustained long-standing ties.

But as if to underscore the law of unintended consequences, the U.S., through its humiliating Afghanistan defeat at the hands of a terrorist militia, has tasted the bitter fruits of the Pakistani generals’ cross-border use of jihadist proxies from behind their protective nuclear shield.

Brahma Chellaney is a geostrategist and the author of nine books, including the award-winning “Water: Asia’s New Battleground”

LETTERS TO THE EDITOR

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Kerala’s rain fury

Heavy rainfall during the retreat of the Southwest monsoon is a rare phenomenon in Kerala. That unexpected torrential rain, accompanied by landslides in the southern and central parts of the State, is wreaking havoc on the physical infrastructure is a grim pointer to the growing vulnerabilities of the coastal State to adverse weather events. Climate change mitigation and adaptability measures

should be taken up on a war-footing. While rescue and relief efforts have improved, the country needs to vastly improve its climate change-resilient infrastructure.

M. JEVARAM, Shoolavandan, Tamil Nadu

Sidhu again

After a lull, Punjab Congress chief Navjot Singh Sidhu has commenced his usual outbursts. What Mr. Sidhu desires is that the government should be

subservient to him and that he should have a greater say in all key administrative decisions. The image of the Congress party has already taken a beating following the ignominious exit of the stalwart, Captain Amarinder Singh. The Congress president needs to crack the whip.

V. JOHAN DHANAKUMAR, Chennai

Tamil Nadu governance

The unprecedented and mammoth victory of the

DMK in the local body elections in Tamil Nadu is recognition the people have given to the government, particularly for the implementation of people-oriented schemes in such a short time. One believes that the Chief Minister is on track to make the State regain its shine. Other leaders and cadres of the DMK should also realise their responsibilities and perform their duties honestly, keeping only the welfare of the people

supreme. The Chief Minister should not hesitate to take severe action against anyone found to be involved in corruption or unlawful activities.

THARCIUS S. FERNANDO, Chennai

Back to the Tatas

The Government’s move to give up its entire stake in Air India is a bold decision. The Tatas winning the bid for the betterment of India’s national airline. I have felt a special affinity

for the airline, having also been a VIP card holder until recently. Till its nationalisation, passengers were assured of the Maharaja’s exemplary service besides travelling on a profit-making airline. The new development should lead to the return of its glory. One also hopes that its much loved logo, the Centaur, returns.

V.P. DHANANJAYAN, Chennai