

A water umpire

The Cauvery water dispute is eluding closure, with Tamil Nadu, Karnataka, and Kerala locked in battle in the Supreme Court over their share of water.

In its statement of objects and reasons for proposing a new inter-State river water disputes law, the Centre lists out the drawbacks in the prevalent Inter-State River Water Disputes Act of 1956. The Act provides for tribunals to be constituted for every inter-State river water dispute. The statement, however, notes the reluctance shown by States to accept the decisions of these tribunals.

“Though the [Cauvery and Ravi Beas Water Disputes Tribunals](#) have been in existence for over 26 and 30 years, respectively, they have not been able to make any successful award till date,” the statement says. There is no time cap for adjudication by these tribunals nor is there any age limit for the chairperson or members of the tribunals. These, among other deficiencies, see disputes drag on for years.

The water tribunal trap

With water becoming scarce, the Centre has proposed the Inter-State River Water Disputes (Amendment) Bill, 2017 for early and amicable resolution of disputes. The Bill proposes that the Centre notify an Inter-State River Water Disputes Tribunal with multiple benches. All existing tribunals dealing with inter-State water disputes would stand dissolved on the date of establishment of this tribunal. Chairmen and other members of the existing tribunals who are aged 70, on the date of commencement of the 2017 Amendment Act, shall cease to hold office on the expiry of three months from the date of the law coming into existence. Disputes already settled by an existing tribunal, prior to the date of commencement of the 2017 Amendment Act, shall not be re-opened.

According to the Amendment Bill, when a State government approaches the Centre with a dispute, the latter shall set up a Disputes Resolution Committee consisting of expert members from relevant fields to resolve the dispute amicably. If the dispute remains unresolved, the Centre, by notification, will refer the matter to the tribunal. The tribunal shall have a chairperson, vice-chairperson, and not more than six members to be nominated by the Chief Justice of India from judges of the Supreme Court or high courts. The term of office of the chairperson is five years or till he attains the age of 70, whichever is earlier. The tenures of the vice-chairperson and other members of the tribunal shall be co-terminus with the adjudication of the water disputes.

The Centre suggests that the total time period for adjudication of a water dispute would be a maximum of four and a half years. The decision of the Bench of the tribunal shall be final and binding.

The new U.S. Fed Chairman is unlikely to opt for policies that might upset the President's plan

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Habitat connectivity crucial for tigers

Responsibility India's place in tiger conservation is crucial as it is home to 60% of the tiger population.

It is not just tiger numbers that are important. Habitat connectivity could be crucial in maintaining genetic diversity and, thereby, the survival of India's three tiger populations, suggests a recent study published in *Scientific Reports*. The isolated tiger population in Ranthambore in Rajasthan demands urgent conservation attention, being at risk of inbreeding and lack of connectivity with other populations.

India's place in tiger conservation is crucial: 60% of the world's wild tigers are found here. Apart from poaching and habitat loss, fragmentation is one of the threats India's tigers face. Tiger populations are now cut off from each other and their genetic profiles reflect this — smaller, isolated populations are less genetically diverse (due to lesser intermixing of different populations) than larger, connected ones. Genetic variation is crucial for evolution and low genetic diversity can threaten the survival of populations.

Scientists from five institutes including the National Centre for Biological Sciences (NCBS) at Bengaluru and Wildlife Institute of India at Dehradun studied genetic variation in India's tigers. While earlier studies had examined only around 12 regions of the tiger genome, this team analysed 10,184 single nucleotide polymorphisms (SNPs), which are several minute changes in the genome, in tissues of 38 wild tigers obtained during post-mortems from across 17 protected areas in India.

Three lineages

They find that genetically, India's tigers comprise three distinct populations: the northwest cluster (consisting only of tigers from Ranthambore), southern (south India) and central (comprising tigers from the Terai, northeast and central India). While the isolated Ranthambore population had the least genetic diversity, the central cluster — which is also the most connected — harboured the highest. "We find that large seemingly more connected populations have more diversity than smaller isolated ones," says lead author Meghana Natesh at NCBS.

The study identifies new patterns that need to be studied in depth: tigers from the northeast and Simlipal (Orissa) appear to derive their ancestry from many regions. At the same time, the Ranthambore population, being cut off from other tiger populations, could be at risk in future due to inbreeding, which could decrease genetic variation in the population already at risk. This cluster needs urgent conservation action, say the scientists. "The future of tigers may depend on connected populations," they add. Tiger corridors could therefore be crucial in maintaining genetic diversity within and between these clusters and, in turn, aiding the survival of India's national animal.

A study of nearly 300 people living in different parts of India found that nine single-base variants (single-nucleotide polymorphisms or SNPs) account

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Air pollution throws shade on India's solar success

A man walks on solar panels in Coimbatore .

Air pollution is diminishing India's capacity to harness power from the sun, experts say, undermining billions being invested in renewables as the energy-hungry giant emerges as a solar superpower.

New research has found the smog and dust that sickens millions across India every year is also sapping solar power generation by more than 25 percent, far beyond levels previously thought. In the first study of its kind, U.S. and Indian scientists measured how man-made particles floating in the air and deposited as grime on solar panels combined to seriously impair sunlight from converting to energy.

This interference causes steep drops in power generation, they found. At present levels in India, it could amount to roughly 3,900 MW of lost energy — six times the capacity of its largest solar farm, a gigantic field of 2.5 million panels. “A simple calculation shows that this is a big amount of energy we are going to lose,” Professor Chinmay Ghoroi, who co-authored the paper, told AFP at the IIT-Gandhinagar. These huge losses will only compound as India realises its grand solar ambitions, experts say.

Jaggi Vasudev's Rally for Rivers claims they will, but this is not based on the most nuanced science

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Déjà vu on the highways

The recent show of aggression by road developers revives memories of what happened six to eight years ago, when wanton bidding had brought the sector to its knees. This time around, it's happening just as the sector is clawing back after years of funk, thanks to the government's ambitious road construction targets and plans to increase allocation for the development of highways. That being the case, are we staring at another potential cul-de-sac?

If so, prudence suggests this would be a good time to ring-fence, metaphorically speaking of course, to pave potential potholes with an asphalt pile of proactive steps. So how aggressive have the recent bids been? To wit: A well-established highway developer recently emerged as the lowest bidder for a very challenging project by quoting way below the reserve price. And this isn't a lone instance—several projects have been bid below their reserve price of late.

In engineering, procurement and construction, or EPC, projects, where the government foots the entire project cost, some exuberance is reasonable, even expected. However, even hybrid annuity model (HAM) projects, where the government's exposure is 40% in the first three years, have seen a confounding rush to quote below the reserve price. Indeed, as much as 40% of the HAM projects have been bid below their reserve price in the past 12 months. It is but natural that such aggressive bidding should squeeze the margins of developers. As such, operating profits are under pressure in the sector due to higher provisioning mandated by new Indian accounting standards.

Which begs the question, what are the reasons cited by developers to justify the aggression? Better control over project execution, superior sourcing strategy for raw materials, and better project management. That isn't entirely convincing, especially because HAM bidders are, by and large, medium-sized developers.

The bigger risk, however, is that competitive bidding could spill over to other public-private partnership modes of development such as build-operate-transfer (BOT). That was indeed the case in 2009-11, when developers were caught in a bidding frenzy. Eventually, there came a stage when developers were stuck with unviable projects and virtually abandoned them. The fall guys were the banks that were left holding lemons.

The ripple effects lasted years, with developers remaining extremely overgeared, while banks—mostly in the public sector—virtually shut off the funding tap. Predictably, fewer projects were awarded. This compelled the National Highways Authority of India (NHAI) to bring in a fairly de-risked model. Following this, things have changed for the better in the past three years and there is a revival of interest in this sector. So much so, even some foreign pension funds are looking at bidding for reverse BOT projects, i.e. under the toll-operate-transfer model. Further, significant improvements have been made to boost participation, including easier norms for exit, upfront payment of arbitration claims, harmonious substitution in projects, and roll-out of HAM.

The government has an ambitious road development programme, aimed at doubling the national highways network from the current 100,000km in the next five to seven years. Given this, it is time the developers did their bit too. More importantly, the NHAI should take a cue from its own experience and put in place adequate safeguards to avoid a repeat of the disastrous cycle at the turn of this decade. Specifically, it could look at six mitigating steps:

1. Provide a risk-adjusted floor and cap price for each of the bids, which would prevent sustained aggressive bidding. Even guidance on a project-to-project basis will set the tone at the time of bidding.

2. Set up an internal review committee to ensure that if deviation from the base price is significant, the developer has the wherewithal to complete the project, and that the reasons cited are appropriate.
3. Blacklist rogue developers who have abandoned projects by quoting aggressively. While this is currently in place, developers do team up as consortia and bid for new projects
4. Strengthen the project preparation process and employ technically superior consultants at the stage of preparation of detailed project reports. This becomes a prerequisite for the authority to confidently approach developers when there is a significant deviation from the base price.
5. The ability to execute in a given time frame defines the calibre of a developer. A grading mechanism can be evolved to make this one of the qualification criteria at the time of the RFQ (request for quotation) stage.
6. Track the portfolio on a rolling quarter basis and have continuous stakeholder interaction with regard to the progress of projects, and to prevent errant developers from bidding.

What such a regimen would herald is long-term sustainability and financial viability for highway projects. Indeed, this is the apposite hour to structurally ring-fence the sector. Not doing so now would bring too much risk back to the table. Neither the lenders nor the highway developers—or, crucially, the government, given the prerogatives of the social compact—can afford to err this time around.

More so since development initiatives are being undertaken despite endemic issues of wherewithal and abiding balance-sheet weakness.

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Centre asks States to focus on impactful and PPP based smart city projects

Centre asks States to focus on impactful and PPP based smart city projects

Rs.32,000 cr worth PPP projects identified so far; 261 impactful projects worth another Rs.31,000 cr

Central government has asked the States to focus on early implementation of smart city projects that have a visible and transformative impact in the lives of citizens in identified smart cities. Further to review of Smart City Mission by Prime Minister Shri Narendra Modi during PRAGATI on the 30th of last month, Shri Durga Shanker Mishra, Secretary (Housing & Urban Affairs) wrote to the Chief Secretaries of all the States and Union Territories in this regard the next day.

Shri Mishra urged the States and UTs to ensure commencement of work by November this year on 261 impactful smart city projects in 60 cities that were announced during January-September, 2016. These identified projects accounts for an investment of Rs.31,112 cr . States and UTs have also been asked to speed up work on 370 PPP projects that involve an investment of 32,410 cr.

The impactful projects identified range from building 40 outdoor fitness centres in New Delhi Municipal Council area at a cost of Rs.1.31 cr to redevelopment of 340 acre area in Bhopal at a cost of Rs.3,000 cr.

An indicative list of impactful projects being taken up in the first batch of 20 smart cities and some others are:

S.No	City	Impactful projects	Investment (Rs. cr)
1	Bhubaneswar	Railway Station Multi-modal hub	845
2	Pune	River Front Development and Heritage City Museum	235
3	Jaipur	Talkatora Lake Development with high quality laser show	130
4	Surat	Logistic Park and smart redevelopment of existing creek	210
5	Kochi (Kerala)	Broadway Market and Ernakulam Market Redevelopment	110
6	Ahmedabad	Intermodal Transport Hub and Slum Rehabilitation	961
7	Jabalpur	River Front Development and Green development of Institutional Zone	310
8	Visakhapatnam(AP)	Beach Redevelopment and Shore Protection	365
9	Solapur (Maharashtra)	Rejuvenation of Siddheshwar Lake and Heritage structures	49
10	Davanagere (Karnataka)	Rejuvenation of Mandakki Bhatti	373
11	Indore	Infrastructure development and Parking	679
12	NDMC	Commercial Development of Yahswant Place	89
13	Coimbatore (Tamil Nadu)	Lake development and Non-Motorised Transport infrastructure	526

14	Kakinada (AP)	Space development along canal between Indrapalem Lock and Jagannaickpur Old Bridge and development of eateries	100
15	Belgavi (Karnataka)	Kanbargi Lake Rejuvenation and recreational spaces	10
16	Udaipur	Area development with water, sewerage and road infrastructure and underground cabling	450
17	Guwahati (Assam)	Brahmaputra River Front Development	532
18	Chennai	Pedestrian Plaza	83
19	Ludhiana	Retrofitting of Sarabha Nagar Market	10
20	Bhopal	Redevelopment of 340 acres of area	3000
	Lucknow	Heritage projects, Cultural Hub and Library	160
	Dharmashala (HP)	Redevelopment of Kacchari Adda and Kotwali Bazar	95
	Chandigarh	Affordable housing in Sector 43	321
	Faridabad (Haryana)	Badkal Lake Rejuvenation	45
	Agra	Taj Orientation Centre	232
	Varanasi	Convention Centre	211
	Rourkela	Brahmani Riverfront Development	129
	Raipur	Market development	1026
	Kalyan-Dombivilli (Maharashtra)	Kalyan Station Improvement	427

Some of the major PPP smart city projects are: Bhubaneswar (Affordable housing-Rs.840 cr), Raipur (Urban Plaza at Ganj Mandi-Rs.983 cr), Bilaspur (Markets development –Rs.1,241 cr), Amritsar (Urban space development –Rs.1,028 cr), Coimbatore (Water supply -557 cr), Warangal, Telangana (Bus stand-Rs.611 cr), Shimla (Tourism and recreation infrastructure- Rs.898 cr), Aligarh (Smart multi-level parking-Rs.289 cr), Bengaluru (Tourism and recreation infrastructure- Rs.234 cr) and Pune (Electrical buses- Rs.170 cr).

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Mountains of garbage: India's neglected waste management crisis

The [collapse of a great wall of garbage](#) in east Delhi's Ghazipur area, sweeping people and vehicles into a nearby canal, is a stark reminder that India's neglected waste management crisis can have deadly consequences. More than a year after the notification of the much-delayed Solid Waste Management Rules, cities and towns are in no position to comply with its stipulations, beginning with the segregation of different kinds of waste at source and their scientific processing. Neither are urban local governments treating the 62 million tonnes of waste generated annually in the country as a potential resource. They have left the task of value extraction mostly to the informal system of garbage collectors and recyclers. Improving on the national record of collecting only 80% of waste generated and being able to process just 28% of that quantum, requires behaviour modification among citizens and institutions. But what is more important is that the municipal bodies put in place an integrated system to transport and process what has been segregated at source. The Swachh Bharat programme of the Centre has focused too narrowly on individual action to keep streets clean, without concurrent pressure on State and municipal authorities to move closer to scientific management by the deadline of April 2018 set for most places, and arrest the spread of pollution from trash.

In the absence of stakeholders at the local body level, recoverable resources embedded in discarded materials are lost due to dumping. Organic refuse, which forms about 50% of all garbage, readily lends itself to the generation of compost or production of methane for household use or power generation. But it is a major opportunity lost. Organic waste that could help green cities and feed small and affordable household biogas plants is simply being thrown away. It is also ironic that while some countries such as Rwanda and Kenya have introduced stiff penalties for the use of flimsy plastic bags, India is doing little to prevent them from drifting into suburban garbage mountains, rivers, lakes and the sea, and being ingested by cattle feeding on dumped refuse. A new paradigm is needed, in which bulk waste generators take the lead and city managers show demonstrable change in the way it is processed. There has to be a shift away from large budgets for collection and transport by private contractors, to the processing of segregated garbage. As the nodal body for the implementation of the new rules, the Central Pollution Control Board should put out periodic assessments of the preparedness of urban local bodies in the run-up to the deadline. Without a rigorous approach, the national problem of merely shifting city trash to the suburbs, out of sight of those who generate it, will fester and choke the landscape. Considering that waste volumes are officially estimated to grow to 165 million tonnes a year by 2030, many more suburbs are bound to be threatened by collapsing or burning trash mountains.

Rajasthan's ordinance shields the corrupt, threatens the media and whistle-blowers

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Preserving our vanishing tribes, their heritage, language and wisdom

The breathtaking Nilgiris are home to a number of indigenous tribes, one of which is Toda.

Unfortunately, the once thriving tribe has fewer than 1,000 members today. Based on the yardstick set by our modern education system, these tribesmen and women are considered illiterate and backward. However, one has to visit their homes, interact with them and see their craft to truly understand the depth of their knowledge, art, traditions and sensibilities.

The Toda tribe is largely dependent on buffalo herding and embroidery for its livelihood. Its members are incredibly skilled artisans known for the red-and-black embroidery on white fabrics that has even earned them a GI (geographical indication) tag. They live sustainable lives, in harmony with nature where all their resources are available. The Toda tribals have their own language, which does not have a script.

Over the last century, their numbers have been dwindling. The sharp decline in their population is largely related to the decline in agriculture land, much of which has been lost to afforestation. With their dwindling numbers, their art, craft and traditions are facing a slow death. If not preserved, the day is not far when their unique embroidery, for instance, is lost forever.

The Todas are an extremely closed community, barely connected to the rest of the world and, thus, deprived of the opportunities connectivity offers. They are not alone in leading marginalized and excluded lives. Overall, Scheduled Tribes account for 8.6% of India's population, according to the 2011 Census.

If we focus on language alone, almost every indigenous tribe speaks its own language or dialect. In fact, according to the People's Linguistic Survey of India, as many as 780 different languages are spoken and 86 different scripts are used in the country. However, only 22 of them are recognized by the government as scheduled languages.

What is even more disappointing is that India has lost nearly 250 languages in the last half century, and 196 more have been declared endangered by UNESCO. As many as 120 of these 196 languages are spoken in the North-East. With most of these languages spoken by tribes and lacking a script, it has been particularly difficult to preserve them.

However, digital media allows for their documentation in audio-visual formats now. Simply recording audio or video of folk songs/folk tales in different languages can help preserve not just the language/dialect but also the folk culture.

In the same manner, the traditional knowledge about sustainable living, medicines, farming and architecture that tribals store in their memories can also be documented for preservation and dissemination.

This is what motivated us to work with the Sahariya tribe in Baran, Rajasthan, in 2007. Here, the Digital Empowerment Foundation (DEF) established a 200 km community network and connected it to a local server. This way, even if the Internet is down, the community can share content and access content through the local server, thus creating an intranet or community network. This has also encouraged the community over the years to create a localized database and archive its oral and traditional knowledge, art as well as culture.

Just like the Sahariyas, the Toda tribe too is a rich repository of culture, craft and heritage. So when the All India Artisans and Craftworkers Welfare Association reached out to us, seeking help

to digitally archive the Toda tribe's knowledge, we were more than happy to help. Together, we are now developing a platform that captures the history, heritage, culture, ecology, traditions, art, craft and stories of the Todas.

The idea behind setting up a digital archive in the form of a website is to not just create a repository of this information for the purpose of preservation but also allow the rest of the world to see—without compromising the uniqueness of their craft or designs—the richness of the Todas.

The Internet has a lot to offer to tribes living secluded lives in the forests. Connectivity can ensure better access to government schemes, entitlements and rights; digital market linkages can enable tribal communities to exhibit their craft and agricultural produce to the world for an improved livelihood; access to the Internet can keep them updated on government notifications and other relevant information; digital documentation can preserve and showcase their richness for posterity.

All of this, along with more, also has a direct connection with social as well as behavioural changes within a community. We envision digitally empowering as many tribes as we can.

We wish to bring the tribes of India under the umbrella of digital inclusion to expose them to the services and opportunities the internet has to offer. However, the intention is not merely to teach community members to operate a computer but to provide them contextual, relevant and timely digital literacy, so that they can access the internet to consume the information it offers and share the knowledge that they hold with the rest of the world.

Osama Manzar is founder-director of Digital Empowerment Foundation and chair of Manthan and mBillionth awards. He is member, advisory board, at Alliance for Affordable Internet and has co-authored NetCh@kra—15 Years of Internet in India and Internet Economy of India.

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China's shift to city-led growth

China has achieved some four decades of rapid economic growth. But one powerful source of growth has yet to be fully tapped: urbanization. Now, the potential of megacities as an engine of dynamism and increased prosperity is finally getting the high-level attention it deserves.

Over the last decade, China has been working to shift from a manufacturing-led growth model fuelled by low-cost labour to an innovation-led, higher-value-added model underpinned by strong productivity gains. Urbanization will be critical to facilitate this shift, not least by enabling economies of scale. Currently, though China is the world's most populous country and its second-largest economy, only half the population lives in urbanized areas, and less than 10% reside permanently in megacities. And the country's urbanization rate remains well below the global average.

Growth in China's megacities—metropolitan areas with a population exceeding 10 million—has long been heavily constrained by rigid state administrative divisions and planning agencies. Indeed, in pursuing rapid industrialization, megacities have often been less successful than smaller cities—which have largely evaded such constraints—in accumulating productive capital, attracting foreign direct investment (FDI), and demonstrating entrepreneurial spirit.

In the 1990s, the small city of Kunshan became China's leading centre for manufacturing electronic products. By integrating themselves into global supply chains, small cities in Guangdong province—including Dongguan, Huizhou, Shunde and Zhongshan—have played a critical role in establishing China as the “Factory Of The World.”

But while the success of smaller cities is to be celebrated, it is China's megacities where the greatest potential to fuel future progress in productivity—and thus GDP (gross domestic product) growth—is to be found. So far, China has just four “first-tier” cities (with populations exceeding 20 million): Beijing, Shanghai, Guangzhou and Shenzhen.

Given the size of China's population and economy, that is not a lot. And, in fact, there is no reason to believe that these megacities have reached their capacity, in terms of population or contribution to economic growth. Moreover, China has many dynamic second-tier cities—such as Chengdu, Tianjin, Hangzhou, Wuhan and Suzhou—that are capable of reaching first-tier status, if given the chance.

In order to maximize the potential of China's cities, the government will need to be much more adaptive and flexible, especially regarding its notoriously strict control of urban land-development ratios. In particular, China must abandon its land-quota system, which not only limits the amount of land cities can develop for future productivity growth, but also allocates a disproportionate share of land to factories. Otherwise, urbanization will continue pushing up already-high housing costs, but not efficiently enough to power sustained growth and development. The good news is that local governments are already working with the central government to alleviate or even eliminate existing administrative constraints.

Another strategy for advancing China's transition towards a city-led growth model is to expand the role played by urban clusters that leverage the strength of first-tier cities to boost growth in less-developed areas. From an economic standpoint, the Yangtze and Pearl River Deltas—which encompass megacities like Guangzhou, Shanghai and Shenzhen—are undoubtedly the most important such urban agglomerations, set to generate higher future productivity gains from economies of scale and complementarity.

Here, too, China's leadership has already caught on. This past March, Chinese Premier Li Keqiang announced a plan for the development of a city cluster in the Guangdong-Hong Kong-Macau Greater Bay Area which covers nine cities, including Guangzhou and Shenzhen, as well as the special administration regions of Hong Kong and Macau.

From 2010 to 2016, the annual GDP of the Greater Bay Area soared from ¥5.42 trillion (\$82 billion) to ¥9.35 trillion (\$1.42 trillion), making it the world's third-largest urban economy, after Tokyo and New York. Yet the population of the Guangdong-Hong Kong-Macau Greater Bay Area is growing fast, and its GDP per capita is less than half that of Tokyo, suggesting that its potential is nowhere near depleted.

Moreover, China's leaders seem to be eyeing a second greater bay area, centred on Hangzhou Bay, which, because it overlaps with the Yangtze River Delta, could go a long way towards integrating that already-prosperous region. Such a cluster could cover the coastal megacity of Shanghai, as well as about 10 more important cities across the Zhejiang and Jiangsu provinces. It would include world-class ports, such as the Port of Ningbo-Zhoushan (the world's busiest in terms of cargo tonnage). The result would be a bay area on the scale of San Francisco and Tokyo.

The pace of China's economic growth over the last four decades has been unprecedented. But China has yet to complete its rise to rich-country status. As it upgrades its economy to become more knowledge-based and technology-driven, it is again leveraging its strengths. There is no better example of this than the ongoing effort to tap the potential of megacities.

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Caution warranted for river-linking project

Is the proposed interlinking of rivers a bold and ambitious engineering project that will resolve the country's water woes or is it an ill-conceived plan built on obsolete ideas that will devastate the country's riverine ecosystems? Even as the government claims to have made significant progress with the initial clearances and negotiations so as to kick-start the project, which has been in the pipeline for several decades, expert opinion on the matter remains as sharply divided as ever.

To be fair, this is to be expected, given the sheer scale and scope of the project: 30 river linkages and more than 3,000 storage structures spread across a 15,000km canal network that will transfer 174 trillion litres of water every year, and will cost a total of Rs5.6 trillion. This puts the river-linking project on a par with some of the most daring feats of engineering attempted in the history of mankind. It is a reimagining of the entire aquatic ecosystem of a country as large and diverse as India. That said, the basic idea driving the project is actually fairly simple: Connect the Himalayan and peninsular rivers via a network of canals so that excess water from one channel can be diverted to another which has inadequate flow.

Proponents of the project, which include successive governments at the Centre, argue that river linking offers three key benefits: It will irrigate about 87 million acres of farmland, control floods, and generate 34 GW of hydroelectric power. These are tantalizing prospects: India's rain-fed farms are forever hostage to the vagaries of nature, so much so that even one bad monsoon has a direct and debilitating economic impact. At the same time, simultaneous floods and droughts in different parts of the country continue to wreak havoc, destroying the lives and livelihoods of millions. India also desperately needs clean energy to fuel its development processes, and if river water can be leveraged and redirected to serve these purposes, that's an option worth exploring.

However, river-linking critics insist that the project is built on bad science and an outdated understanding of water systems and water management. Specifically, the concept of surplus and deficit river basins—which is at the core of the river-linking project—is contested. A new study by researchers at the Indian Institutes of Technology in Mumbai and Chennai, analysing weather data over 103 years (from 1901 to 2004), has found that rainfall has decreased over the years by more than 10% even in river basins that once had a surplus, such as those of the Mahanadi and the Godavari.

Also, the project seems to view the river as a unidimensional water pipeline when it is, in fact, an entire ecosystem—and any changes to its natural course will have an impact on all the flora and fauna, the wetlands and the floodplains that are intricately linked to the river system. In fact, the long-term environmental impact of such a project is a major concern. For example, one of the reasons why the Ken-Betwa link, which is now receiving priority attention, has been stuck for several years is because it requires environmental clearance for diverting 5,500 hectares from the Panna National Park, a tiger reserve. Critics also point to the less than positive experience that other countries have had with such projects—be it the Soviet regime's decision to divert the Amu Darya and the Syr Darya, which fed the Aral Sea, to irrigate the desert, or the Australian government's experiments in its Murray Darling basin.

There are political challenges as well. Water transfer and water sharing are sensitive subjects that have already spawned century-long disputes, and few political parties today can expect to win the next election if they are seen as having signed away a scarce natural resource. Moreover, water is a state subject in India, and even though the Centre is empowered to bring an inter-state river under its control to serve the national interest, it has effectively never done so owing to enormous resistance from the states.

The resultant turf wars are already under way—with the Ken-Betwa link, for example, the governments of Uttar Pradesh and Madhya Pradesh have been unable to agree on how much water should be transferred from the Ken river. Union water resources minister Nitin Gadkari intervened a few days ago and has called for a meeting of the chief ministers concerned, but this will not be an easy political bargain—no matter that the same party leads both the state governments and at the Centre.

Given all these concerns, not to mention the massive price tag, perhaps the government would do well to consider other interventions, both on the supply side and the demand side, such as conservation of water resources and more efficient irrigation and agricultural practices, etc., to deal with India's looming water crisis.

What effect do you think the interlinking of rivers will have on the country's economy and ecology? Tell us at views@livemint.com

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U.S. environmental agency eyes limits to herbicide linked to crop damage

Collateral damage: At his farm in Arkansas, John Weiss with his crop of soybeans, which has shown signs of damage due to the drifting of Monsanto's pesticide Dicamba. | Photo Credit: [Reuters](#)

The U.S. environmental agency is considering banning spraying of the agricultural herbicide dicamba after a set deadline next year, according to state officials advising the agency on its response to crop damage linked to the weed killer.

Setting a cut-off date, possibly sometime in the first half of 2018, would aim to protect plants vulnerable to dicamba, after growers across the U.S. farm belt reported the chemical drifted from where it was sprayed this summer, damaging millions of acres of soybeans and other crops.

A ban could hurt sales by Monsanto Co. and DuPont which sell dicamba weed killers and soybean seeds with Monsanto's dicamba-tolerant Xtend trait. BASF also sells a dicamba herbicide. It is not yet known how damage attributed to the herbicides, used on Xtend soybeans and cotton, will affect yields of soybeans unable to withstand dicamba because the crops have not been harvested.

The Environmental Protection Agency discussed a deadline for next year's sprayings on a call with state officials that addressed steps the agency could take to prevent a repeat of the damage, four participants on the call told Reuters.

A cut-off date for usage in spring or early summer could protect vulnerable plants by only allowing farmers to spray fields before soybeans emerge from the ground, according to weed and pesticide specialists.

Monsanto spokeswoman Christi Dixon told Reuters that the agency had not indicated it planned to prohibit sprayings of dicamba herbicides on soybeans that had emerged. That action "would not be warranted," she said. The EPA had no immediate comment.

EPA officials made clear that it would be unacceptable to see the same extent of crop damage again next year, according to Andrew Thostenson, a pesticide specialist for North Dakota State University, who participated in the call.

State regulators and university specialists are pressuring the EPA to decide soon on rules guiding usage because farmers will make planting decisions for next spring over the next several months.

Tighter usage limits could discourage cash-strapped growers from buying Monsanto's more expensive dicamba-resistant Xtend soybean seeds. Dicamba-tolerant soybeans cost about \$64 a bag, compared with about \$28 a bag for Monsanto's Roundup Ready soybeans and about \$50 a bag for soybeans resistant to Bayer's Liberty herbicide. Already, a task force in Arkansas has advised the state to bar dicamba sprayings after April 15 next year.

"If the EPA imposed an April 15 cut-off date for dicamba spraying, that would be catastrophic for Xtend — it invalidates the entire point of planting it," said Jonas Oxgaard, analyst for investment management firm Bernstein.

Monsanto has projected its Xtend crop system would return a \$5 to \$10 premium per acre over soybeans with glyphosate resistance alone, creating a \$400-\$800 million opportunity for the company once the seeds are planted on an expected 80 million acres in the U.S., according to Mr.

Oxgaard.

By 2019, Monsanto predicts U.S. farmers will plant Xtend soybeans on 55 million acres, or more than 60% of the total planted this year. About 3.1 million acres of soybeans vulnerable to dicamba were hurt by sprayings this summer, accounting for 3.5% of U.S. plantings, according to the University of Missouri.

Chemical companies have blamed the crop damage on farmers misusing the herbicides. Specialists, though, say the weed killers are also risky because they have a tendency to vaporise and drift across fields, referred to as volatility.

It teaches the lesson of cooperation and living within the ecological means of a place By S. Vishwanath

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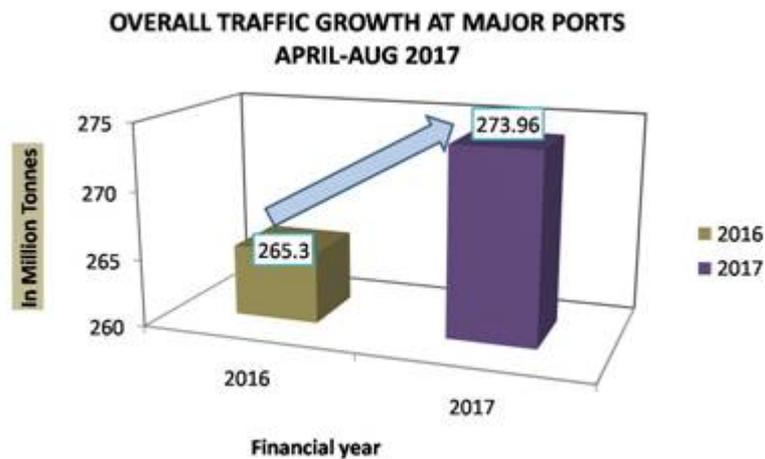
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Technology Advancement uplifts Productivity at India's Major Ports

Technology Advancement uplifts Productivity at India's Major Ports

12 Major Ports Handle 273.96 Million Tonnes Cargo from April-August,2017

Technological advancement for modernization of major ports and reforms for enhancing ease of doing business are driving and sustaining the growth trend line at India's major ports. The country's 12 major ports together handled 273.96 Million Tonnes of cargo between April to August, 2017 as against 265.31 Million Tonnes handled during the corresponding period of previous year, an overall growth of 3.26%.



Source: Indian Port Association

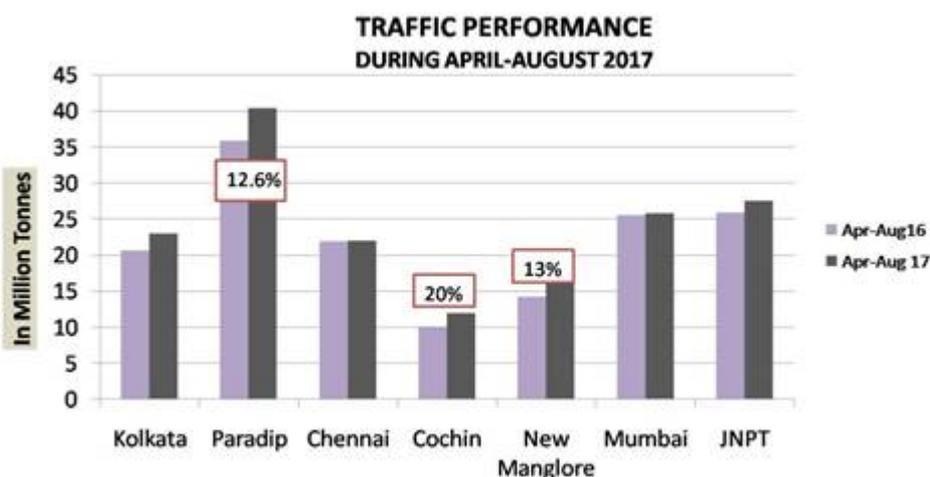
Seven Ports (Kolkata, Paradip, Chennai, Cochin, New Mangalore, Mumbai and JNPT) registered positive growth in traffic during the period April to August 2017.

Cargo traffic handled at Major Ports:

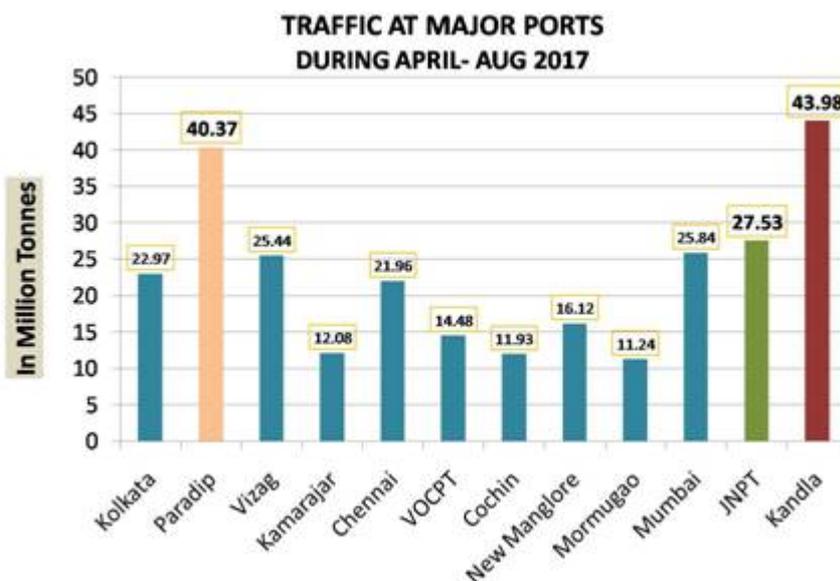
- Ø The highest growth was registered by Cochin Port (19.99%), followed by New Mangalore (13.26%), Paradip (12.57%), Kolkata [incl. Haldia] (11.45%) and JNPT(6.18%)
- Ø Cochin Port growth was mainly due to increase in traffic of POL (27.99%) and Containers (12.79%).
- Ø In Kolkata Port, overall growth was positive i.e. 11.45%. Haldia Dock Complex (HDC) registered positive growth of 19.08%, mainly due to increase in iron ore traffic.

Ø During the period April to August, 2017, Kandla Port handled the highest volume of traffic i.e. 43.99 Million tonnes (16.06% share), followed by Paradip with 40.37 Million Tonnes (14.74% share), JNPT with 27.54 Million Tonnes (10.05% share), Mumbai with 25.84 Million Tonnes (9.43% share), and Visakhapatnam with 25.45 Million Tonnes (9.29% share). Together, these five ports handled around 60% of Major Port Traffic.

Ø Commodity-wise percentage share of POL was maximum i.e. 34.00%, followed by Container (20.17%), thermal & Steam Coal (12.82%), Other Misc. Cargo (12.12%), Coking & Other Coal (7.49%), Iron Ore & Pellets (6.84%), Other Liquid (4.29%), Finished Fertilizer (1.17%) and FRM (1.10%).



Source: Indian Port Association



Source: Indian Port Association

The RFID tagging at gates has been implemented at all ports. This enables seamless entry-exist of trucks and in-port movement to optimize cargo flow, besides enhancing security. Trucks as well as drivers' entry-exist is recorded using RFID card system doing away with paperwork thus

reducing human interface. This is one of the steps taken in order to benchmark major ports with globally renowned ports.

The Ministry has also been proactively undertaking legislative reforms to weed out old obsolete laws and enhancing connectivity of ports to improve their efficiency under its Sagarmala Programme.

With India striving to improve its manufacturing competitiveness with Make in India, the Govt of India is leaving no stone unturned to make ports the drivers of socio- economic change and aid long term growth trajectory of the economy. The resounding success of IPO of Cochin Shipyard Ltd is one such example of the positive investor sentiments. The issue got oversubscribed 76 times. Recently the RBI report has also acknowledged higher growth in cargo traffic as well as efficiency gains measured in turnaround time at ports which is helping in transforming Indian economy.

NP/MS

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China looks to ban petrol, diesel cars

A BMW in Shenyang in China's northeastern Liaoning Province.AFPSTR

China is joining France and Britain in announcing plans to end sales of gasoline and diesel cars.

China's Industry Ministry is developing a timetable to end production and sale of traditional fuel cars and will promote development of electric technology, state media on Sunday cited a Cabinet official as saying.

The reports gave no possible target date, but Beijing is stepping up pressure on automakers to accelerate development of electrics.

China is the biggest auto market by number of vehicles sold, giving any policy changes outside importance for the global industry. A Deputy Industry Minister, Xin Guobin, said at an auto industry forum on Saturday that his Ministry has begun "research on formulating a timetable to stop production and sales of traditional energy vehicles", according to the Xinhua News Agency and the Communist Party newspaper *People's Daily*.

France and Britain announced in July that they will stop sales of gasoline and diesel automobiles by 2040 as part of efforts to reduce pollution and carbon emissions that contribute to global warming.

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Data base soon on Bonda migration

The Bonda Development Agency (BDA) has started an inquiry and survey in the remote Bonda-inhabited villages in Malkangiri district of Odisha following reports that these primitive tribals are migrating to other States in search of employment and that some of their women are being sexually exploited.

A minor Bonda girl recently lodged a complaint with the Mudulipada police station, alleging that a man had lured her through promises and made her pregnant. She is seven months pregnant now. According to media reports, another minor Bonda girl has also come up with a similar allegation but has not approached the police.

Dubious contractors

Both the girls had allegedly fallen prey to dubious labour contractors in adjoining Andhra Pradesh. They along with several other Bonda men and women had migrated to Andhra Pradesh in search of work. It is alleged that labour contractors take these Bondas outside the State as cheap labour.

As allegations are rife about mass migration of Bonda tribals from Odisha in search of livelihood, the administration has taken the issue seriously.

Since Wednesday, officials of the BDA have started an on-the-spot inquiry and survey relating to migration and alleged sexual harassment of Bonda women outside the State.

Proper investigation

Speaking to *The Hindu* on Thursday, BDA project leader Manga Panna accepted that some Bondas undertake seasonal migration after the end of the kharif season and return by Durga Puja to start agricultural work. Through the on-the-spot inquiry and enumeration, the BDA plans to prepare a proper data base about Bonda migration and realise the reasons behind it. Mr. Panna said the allegations of sexual harassment would be properly investigated by the police and the culprits would be punished.

Since Wednesday, Mr. Panna himself has visited two Bonda villages and within the next few weeks all the 32 Bonda villages would be covered by BDA officials.

Most primitive tribe

Bondas are considered to be one of most primitive tribes in the world.

As per an official survey in 2015, around 8,000 Bonda tribals live in 32 villages of four panchayats under Khairaput block. Their villages are located in remote and isolated hilly region north-west of the Machhkund river. Their habitat in Khairaput block is called the Bonda valley.

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A forest policy on today's terms

The Union Ministry of Environment, Forest and Climate Change as well as all State Forest Departments are guided by the National Forest Policy, 1988, which states: "The basic objectives that should govern the National Forest Policy are the following: Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country."

This laudable aim is obscured by the unfortunate fact that there is no such thing as an 'ecological balance'. The term originated as 'the balance of nature' in ancient Greece and was quoted off and on through the Middle Ages. However, with a better understanding of the functioning of natural systems, the concept was completely rejected by the beginning of the last century and does not find mention in textbooks of ecology. Similarly, the concept of 'environmental stability' is questionable because it is evident that natural processes are never stable or stagnant but are always in the process of change and succession. Therefore, environmental stability is a myth.

It is interesting that there is no official definition for the term 'forest' yet, despite ministries and government departments being named after it. In order to couch the laudable goals of the 1988 National Forest Policy, in valid terms, we would first need to define the term 'forest'. This is not a difficult task, since a forest is a self-sown and self-regenerating community of plants that supports a community of creatures dependent on those plants, and on each other, for food and shelter.

The 'self-sown' bit is important in the Indian context, since vast amounts of public money have been spent on 'planting forests', which is an oxymoron. Naturally there are no results to show for these 'planted forests', and Haryana has recently shown the way by practically stopping 'forest plantation' in favour of protecting and permitting existing vegetation to grow.

Having defined a forest, we can now state the primary aim of the 1988 National Forest Policy in the following valid terms: "Maintenance of a healthy natural environment through preservation and, where necessary, restoration of the original natural ecosystems that have been adversely affected by over-exploitation of the forests and other natural resources of the country."

It may be noted that the term 'original natural ecosystems' refers to the state of affairs prior to their exploitation by humans.

The second point of the policy states: "Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country."

Perhaps this should include grasslands, wetlands, and other ecosystems, and could therefore be stated as follows: "Conserving the natural heritage of the country by preserving natural forest and other ecosystems with their vast variety of flora and fauna, and encouraging such ecosystems to expand into areas they had formerly colonised, but from where they have been extirpated." This would suggest that degraded lands be protected so that original ecosystems can re-establish themselves on those lands. When land has been thoroughly degraded, the usual succession is grasses, shrubs, bushes and, finally, trees. By planting trees directly in such areas, we try to jump the gun, but the build-up of top soil and soil microorganisms that proceeds from a succession is missing, hence the large-scale failure of such plantations.

The third point needs some modification, too. It states: "Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs."

It does not suggest how this is to be done and why this point fits in, in the policy. Perhaps if it were stated in this way: “Protecting the catchment areas of rivers, lakes, reservoirs to enable natural vegetation to grow back unhindered to conserve soil, help groundwater recharge, for mitigating floods and droughts and for retardation of siltation of reservoirs.” The justification for this wording is that the natural vegetation of an area has evolved over millennia to adjust to the rainfall regime, soil conditions, and the subsurface water systems of an area. In places where catchment areas have untouched natural vegetation, rainfall percolates into the soil and is released over a period of months, resulting in perennial streams and rivers. Where this has been damaged, the streams, rivulets and rivers have become seasonal, as in peninsular India.

The final point that needs modification is 2.2 of ‘basic objectives’: “The principal aim of Forest Policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which are vital for sustenance of all lifeforms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim.”

This is a laudable point, but the terms of reference are not valid. Therefore, it might be better to state this in the following terms, so that the spirit of what is being stated is not lost: “The principal aim of Forest Policy must be to ensure a healthy natural environment and the maintenance and healthy functioning of life-support systems, including the water cycle and nutrient cycle, by protecting natural forest and other ecosystems native to the area. The derivation of direct economic benefit must be subordinated to this principal aim since the indirect economic benefit of healthy life-support systems is incalculable.”

The remainder of the Forest Policy document is stated in valid language and needs no modification.

Couched in these terms, the Forest Policy document develops an overarching responsibility for the Ministry of Environment, Forest and Climate Change towards restoring and maintaining the health of India’s surface and sub-surface water systems, since both are largely governed by forests and other natural ecosystems. The protection of healthy natural ecosystems in catchment areas should be a vital national goal, given the challenges of failing freshwater systems facing the nation at present. The State Forest Departments are the entities that can do the most in this context, by stopping invalid practices like planting forests and instead use that money in sensible ways to directly and indirectly protect natural ecosystems in sensitive areas like watersheds, catchment areas, and coasts, as has already been envisaged in the National Forest Policy, 1988.

What is worrisome, however, is that in the 30 years since it was formulated, no officer of the Indian Forest Service has pointed out these shortcomings. There is clearly an urgent need to review the curriculum of the Indian Forest Service since it seems to rely on concepts that have been discarded more than a century ago.

Peter Smetacek runs the Butterfly Research Centre in Bhimtal, Uttarakhand

The new U.S. Fed Chairman is unlikely to opt for policies that might upset the President’s plan

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Another way climate change might worsen megastorms

In a recent talk about his new book, *Scale*, physicist Geoffrey West described climate change as a form of entropy—disorder that's created as the price of all the order and creative energy pent up in cities. In this view, climate change is not, as some argue, just a euphemism for global warming. It's a broader term that reflects the unpredictable, disorderly way global warming will affect the planet's oceans and atmosphere.

In other words, we won't be so lucky as to see a regular, incremental increase in the earth's average temperature. Instead, we're seeing rapid, erratic changes in weather patterns that people have counted on for centuries.

Consider one of the more interesting hypotheses about global warming: that it will cause the wind patterns that normally keep storms moving from place to place to slow down, causing prolonged downpours as well as droughts. It's an idea that's been cited in the peer-reviewed literature and featured in *Scientific American*, but like many exciting ideas in science, it's still not universally accepted. Some are waiting for more evidence.

For people who've looked into the slowing of wind circulation, however, Hurricane Harvey was a case in point. Part of the reason it was so destructive was because it got slowed down over Houston. The storm was caught between two high-pressure blocking systems shortly after it made landfall in Texas, so instead of rolling over the region, it got stuck for several days, dumping 50 inches of rain over an enormous area—a total of 19 trillion gallons. The longer it lingered, the more rain fell; ultimately, some parts of the state saw a year's worth of rainfall in less than a week.

Charles Greene, an atmospheric scientist at Cornell University, believes that warming in the Arctic led to a slowing down of a high-altitude, circulating wind known as the jet stream, which he argues contributed to Harvey's lingering destruction. If that turns out to be the case, it portends more such events to come. He suspects recent droughts in the western United States may have been exacerbated by the same phenomenon, as a more sluggish jet stream allowed masses of dry air to get locked into place.

Why would global warming affect winds and storms? As Greene explains, warming isn't happening in a uniform way. The Arctic is warming faster than the earth's temperate zones, and so there's less of a difference than there used to be between Arctic and mid-latitude temperatures. "These temperature differences are what drive atmospheric winds," he said, which include the jet stream and a more northerly circulation pattern called the polar vortex. The polar vortex normally confines frigid air to the Arctic, and when it weakens, Arctic air can swing south and create unusually cold weather at lower latitudes.

The Arctic is warming faster than the rest of the planet because there's a positive feedback loop at work. As reflective sea ice melts, it exposes dark ocean underneath, he said. That means more of the sun's energy gets absorbed into the oceans, driving yet more warming in a positive feedback system. In the fall, some of the ocean's heat is released back into the atmosphere. That change in Arctic temperature alters the polar vortex, slowing and weakening it. That has coincided with an increase in the number of tropical cyclones and nor'easters.

In his view, the warming Arctic is also causing the jet stream to slow, and thereby allowing the formation of more "blocks" of high pressure to lock storms such as Harvey in place. He acknowledges, however that there isn't enough evidence yet to link cause and effect, or rule out natural variability.

Kevin Trenberth, climate scientist at the National Center for Atmospheric Research in Boulder, Colorado, says Greene and his colleagues have more work to do to demonstrate the links between Arctic melting, wind patterns and extreme weather. But there are already well-established links between global warming and storms.

Trenberth's work focuses on the oceans, which are heating up along with the atmosphere. While the surface of the ocean has been slowly warming since the mid-20th century, the 1990s brought something new: Water started to warm up 700 to 2,000 metres below the surface. The increase is small, he said, but the total energy pent up under the surface is enormous. Normally, big storms churn up cold water from the depths, and this allows their energy to peter out. Now that there's warmer water below the surface, there's extra heat available, he said, and that can cause a storm to intensify and last longer.

And that's not the only way global warming can lead to more destructive storms. It's well understood that warmer air holds more moisture, which allows Harvey and other storms to pack more precipitation. Warmer oceans also likely added fuel to this storm, and will continue to do so over the course of the century. The water in the Gulf of Mexico is 2 to 4 degrees warmer than it has been historically this time of year, said Greene. Warmer water allows storms to intensify fast, as Harvey did by going from Category 2 to Category 4 within hours. Now, Hurricane Irma seems to be doing the same thing as it heads toward Florida.

The arguments among scientists are for the most part not about whether global warming is contributing to extreme weather, but which consequences of global warming will wreak the most havoc. In his talk, physicist Geoffrey West explained that the kind of disorder associated with global warming is the price we pay for our ordered civilization. There's no reason to be ashamed that it's happened—or to deny it. Better to look forward and realize it's still possible to mitigate the damage, and to adapt. **Bloomberg View**

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Say goodbye to gasoline: China's going electric

Sydney: Say goodbye to gasoline. The world's slow drift toward electric cars is about to enter full flood.

China, one-third of the world's car market, is working on a timetable to end sales of fossil-fuel-based vehicles, the country's vice-minister of industry and information technology, Xin Guobin, told an industry forum in Tianjin on Saturday. That would probably see the country join Norway, France and the UK in switching to a wholly electric fleet within the lifetime of most current drivers. The announcement is important because the most influential players in the global auto market have always been not companies, but governments.

Diesel cars make up about half of the market in the European Union (EU) and less than a percentage point in the US, largely because of different fuel-taxation and emissions regimes. Carburetors have been regulated out of most developed markets as fuel injection—originally a more costly technology—results in less tailpipe pollution.

Moves toward electrification of the world's cars have been tentative. Just 695,000 electric vehicles were sold in 2016, according to Bloomberg New Energy Finance (BNEF), equivalent to about three days of sales in an 84 million-strong market. Including those already on the roads, the global car fleet is roughly a billion-strong.

At the same time, the direction of travel is unambiguous. China's auto industry plan released in April envisages new energy vehicles—including electric and hybrids—making up all the future sales growth in the country.

With conventional cars plateauing at current levels, new-energy vehicle sales will reach 7 million annually in 2025.

As many as 800,000 charging stations will be built this year alone, according to the official China Daily.

Government mandates will require manufacturers to sell 8% of their vehicles with electric or hybrid power trains from next year, or purchase credits to make up the difference, rising to 20% by 2025.

India, due to overtake Germany and then Japan as the world's third-biggest auto market by 2020, is on a similar path. Prime Minister Narendra Modi's think-tank Niti Aayog aims to get electric vehicles to 44% of the fleet by 2030, and is aggressively favouring them with tax rates 31 percentage points below those on hybrids and internal-combustion-engine cars under its new harmonized GST.

France and the UK, the world's sixth- and seventh-biggest markets, are planning to phase out sales of non-electric cars by 2040, while Norway aims to reach that line 10 years earlier.

Neither of those targets looks especially ambitious, given the rapid drop in battery costs—in the US and EU, electric cars will reach price parity with conventional vehicles in terms of purchase and running costs around the mid-2020s, according to BNEF.

The International Energy Agency believes the use of oil in passenger cars has already more or less peaked, with just 7% of demand growth by 2040 set to come from the sector.

The pattern will accelerate as major automakers dedicate more of their research and development

budgets—and, subsequently, lobbying funds—to the EV transition.

Until the first Tesla Inc. Roadster went on sale just nine years ago, Mitsubishi Motors Corp. was the only major car company to take the prospect of fully electric vehicles seriously. Now, every large automaker is working on battery-powered cars, with even longstanding skeptics like Fiat Chrysler Automobiles NV's Sergio Marchionne and Maruti Suzuki India Ltd.'s R.C. Bhargava announcing plans in recent weeks.

For all the eye-catching symbolism of a ban, it's unlikely that fossil fuel will soon be illegal on the roads.

Gasoline and diesel cars will still be sold in 2040, and probably 2050 and 2100 as well.

But with an increasing cost disadvantage and growing infrastructure issues, as gas stations close or go electric, internal-combustion engines will be sold only to enthusiasts—like high-performance sports cars, kit cars and vintage cars are, today.

The conventional car isn't quite dead yet—but its years are numbered. **Bloomberg Gadfly**

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Cabinet approves survey of Un-appraised Areas of Sedimentary Basins of India**Cabinet approves survey of Un-appraised Areas of Sedimentary Basins of India**

The Cabinet Committee on Economic Affairs chaired by the Prime Minister, Shri Narendra Modi, today gave its approval for a significant project to acquire 48,243 Line Kilometer (LKM) 2D seismic data for appraisal of Indian sedimentary basins where limited data is available.

The project will help in increasing the investments in domestic production of oil and gas. The project will be implemented by NOCs, i.e. Oil India Limited (OIL) and Oil and Natural Gas Corporation (ONGC). OIL will conduct survey in North - Eastern States while remaining area will be covered by ONGC. Survey work will be carried out in 24 States.

Total estimated cost of the entire project is Rs. 2932.99 crore spread over five years. Initially National Oil Companies (NOCs) are meeting the fund requirement from their own sources, which will be reimbursed by the Government.

Entire project is likely to be completed by 2019-20. Directorate General of Hydrocarbons is monitoring the project and reviewing the progress on monthly basis.

Project involves engagement of large number of workers at local level where work is to be executed. This is likely to generate direct as well as indirect employment for about 11,000 people in the form of skilled and unskilled workers and suppliers for support services. After the appraisal of these basins, and based on the prospectivity of the area, blocks will be offered for further exploration & production activities which will further generate employment.

Background:

India has 26 sedimentary basins covering an area of 3.14 Million Sq Km spread over onland, shallow water and deep water. An area of about 1.502 Million Sq. Km i.e. 48% of total sedimentary basin area does not have adequate geo-scientific data. As a base to launch future Exploration and Production (E&P) activities, appraisal of all unappraised areas has been considered an important task. The preparatory work started in 2015-16 and actual survey work started in 2016-17 and more than 9100 LKM 2D seismic data has been acquired till July, 2017.

Data acquisition is important as it helps in giving the initial insight into the basins and helps in planning the future E&P activities. It will be useful in deciding the focus areas of the exploration activities in the country and on the basis of this primary data, E&P companies would take up further exploration activities in the acreages allocated to them.

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Shri Nitin Gadkari says work on Three River Interlinking projects to begin within three months

31st Annual general meeting of The National Water Development Agency Society held today

The Minister for Water Resources, River Development and Ganga Rejuvenation, Road Transport & Highways and Shipping Shri Nitin Gadkari has said that his Ministry will start work on three river interlinking projects within the next three months. These include the Ken-Betwa Linking Project, Damanganga- Pinjal Link Project and the Par-Tapi-Narmada Link projects. Shri Gadkari said that the three projects are ready with all necessary approvals, and he will hold meetings with the concerned Chief Ministers soon to sort out inter-state issues so that the three projects can take off within the next three months.

Shri Gadkari was speaking at the 31st Annual General Meeting of the National Water Development Agency Society in New Delhi today. Ministers of State for Water Resources, River Development and Ganga Rejuvenation Shri Arjun Ram Meghwal and Shri Satya Pal Singh were also present on the occasion. The AGM was also attended by Water Resources/ Irrigation Ministers from the states of Andhra Pradesh, Telangana, Kerala, Uttar Pradesh, Uttarakhand, Jharkhand and Rajasthan.

Expressing his concern about the plight of people in the thirteen drought prone and seven flood prone regions of the country, Shri Gadkari stressed upon the need to develop effective means for conserving the available water and sharing what is surplus. In this context he said there is a need to evolve ways to conserve the nearly 60-70 percent of water that runs-off into the oceans.

Shri Gadkari also said that socio- economic cost of water projects should be taken into account while preparing DPR. He also underscored the need for developing innovative funding models for water projects, and accessing loans at very low rates of interest. He assured that he would also take up this issue with the Central Government.

The Minister of State Shri Satya Pal Singh said that successful models of water conservation and water management from different parts of the country should be documented and circulated by the Ministry so that regions can benefit from each others' experience.

The State Water Resources Ministers drew attention to the specific water related issues in their respective states and how they were dealing with these issues.

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A fragile ark that shelters 2,626 creatures

In a first, the Zoological Survey of India (ZSI) has published a compendium of animal species in the Indian Sundarbans, estimating that there are 2,626 of them in the fragile island ecosystem. The listing includes a diverse 25 phyla, as they are biologically classified.

The Indian segment of the Sundarbans, part of a UNESCO World Heritage site, forms part of the Ganga-Brahmaputra delta across 9,630 sq. km, distributed among 104 islands.

The region hosts 2,487 species that come under the zoological kingdom of Animalia, and 140 under the more primitive Protista.

“The publication titled *Fauna of Sundarban Biosphere Reserve* is the first consolidated and updated information of the faunal diversity of the Sundarbans. It lists over 2,600 species, including the new species described from the mangrove ecosystem as well as threats faced by them due to climate change,” ZSI Director Kailash Chandra told *The Hindu*.

Biswajit Roy Chowdhury, secretary of Nature Environment and Wildlife Society, a non-governmental organisation and one of the authors of the publication, says it is encyclopedic in its scope.

“When we talk about Sundarbans we refer to only a few major species in the reserve forest area in about 4,260 sq. km. The publication catalogues the entire faunal diversity of Sundarban Biosphere Reserve covering 9,630 sq. km spread over 19 blocks in South 24 Parganas and North 24 Parganas of West Bengal,” Mr. Roy Chowdhury said.

Gone missing

The researchers document the famous tigers of these islands, which have adapted to aquatic conditions around, the human-tiger conflict, and behaviour of the big cat. The fortunes of 50 mammalian species including the Asian small-clawed Otter, Gangetic Dolphin, Grey and Marsh Mongoose and the wild Rhesus Monkey, the only primate here, are also documented.

“Due to pressure on habitat from people and natural threats that have shrunk the mangrove swamp habitat, mammal numbers are declining,” the authors say. Two Rhinos, Swamp deer, Barking deer and Hog deer and Asiatic Wild Water Buffalo are not found in Sundarbans anymore, they say.

There are 356 species of birds, the most spectacular being raptors, or birds of prey, that occupy the highest canopies of the forest. Osprey, Brahminy Kite and White-Bellied Sea Eagle are dominant, while Rose-ringed parakeets, flycatchers and warblers are also found in the middle tier, while in the lower tier, kingfishers abound — and the Sundarbans has nine of them.

There are 11 turtles, including the famous Olive Ridley and Hawksbill sea turtles and the most threatened freshwater species, the River Terrapin.

A crocodile, 13 lizards including three species of Monitor Lizards and five Geckos are found here. The rivers, creeks channels and the islands together harbour about 30 snake species, led by the King Cobra, considered vulnerable by IUCN.

Others documented are the Monocellate or monocled cobra, Russell's viper, common and banded kraits. Besides, ten species of frogs and toads are found.

Cartilaginous fish

The mangrove ecosystem covers about 350 species of fish. Cartilaginous fish, which have skeletons of cartilage rather than bone, make up 10.3%. The IUCN conservation status shows 6.3% fish are near-threatened and 4.85% are threatened. Also, there are 173 molluscs.

In another indication of its richness, 753 insect species are encountered in the Sundarban Biosphere Reserve. Of these, 210 are butterflies and moths. Moreover, Crustaceans — crabs, shrimp and prawns — constitute 334 species.

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An alliance on track: on the bullet train project

When Japanese Prime Minister Shinz Abe meets Prime Minister Narendra Modi in Ahmedabad this week, [the bilateral agenda](#) will range from issues of maritime security to nuclear energy and trade. But at the centrepiece of their summitry will be the [inauguration of India's first high-speed rail corridor](#) from Mumbai to Ahmedabad, to be developed using Japanese technology and financing.

The image of the platypus-snouted blue and white Shinkansen streaking past a snow-topped Mount Fuji has become as synonymous with Japan as sushi. Since October 1964, when the first bullet trains collapsed the time it took to cover the 552 km between Tokyo and the commercial centre of Osaka to four hours (today it is down to 2 hours, 22 minutes), the Shinkansen has emerged as the symbol of Japan's post-World War II ascent to economic superpowerdom. It encapsulates the archipelago's engineering might and almost preternatural standards of safety and punctuality. Japan's Shinkansen have carried over 10 billion passengers to date, without a single accident or casualty and an average delay of less than one minute.

Also read

The track to success: on the bullet train project

Yet, despite this admirable track record, Japan has struggled to export its bullet train know-how, even as Mr. Abe has made selling the technology abroad a cornerstone of his game plan to revitalise the stagnant Japanese economy. Before signing on India, Taiwan had been Japan's only successful sale. But Taiwan is hardly a poster child for the system, given that its high-speed line has suffered heavy losses since opening in 2007.

Profitability is a notoriously hard ask for high-speed train networks. Most lines across Europe, for example, are in the red. In Japan, some routes, notably Tokyo-Osaka, are profitable, but to achieve this requires high volumes of passengers and highly priced tickets. It costs around \$130 for a one-way Shinkansen ticket from Tokyo to Osaka. And over 350 trains operate on this line daily, ferrying about 163 million passengers a year. The region served is demographically dense, home to over half of Japan's population. These conditions are not easy to replicate and other high-speed lines in Japan have struggled.

The latest challenge to Japan's ambitions is the emergence of China as the new emperor of the superfast train. Over the last decade China has developed a 22,000 km high-speed rail network. It boasts the [world's fastest train](#), the Shanghai Maglev that hits speeds of 430 km. Its technology is also cheaper, making it an attractive proposition for the cost-conscious developing and middle-income countries of Asia.

In 2015, China pipped Japan to the post at the last minute by securing a [high-speed rail project in Indonesia](#) that had been considered by Tokyo to be in the bag. One reason Beijing unexpectedly won out was because China offered to finance the line without any recourse to Indonesia's government coffers. In the years since, the project has stalled following land acquisition problems. Nonetheless, China has also beaten Tokyo to becoming Thailand's partner of choice for its first high-speed rail line, permissions for which were finally granted after a two-year delay.

The battle to export bullet trains is clearly reflective of the broader rivalry between China and Japan for influence in Asia. Consequently, the India deal is not only a business coup for Japan but also a geostrategic one. Former Ambassador of Japan to India and President of the Japan-India

Association, Hiroshi Hirabayashi, acknowledged as much. “India is not Indonesia or Thailand. It is a great nation, totally autonomous. And it’s not as likely to submit to Chinese pressure,” he said of India’s decision to go with Tokyo.

For Japan, the Mumbai-Ahmedabad contract has been hard-won. It entails a loan worth \$12 billion, at 0.1% interest, to be paid back over 50 years, taking care of over 80% of the project’s estimated costs. Japan will also supplement the financing with a generous package of technical assistance and training.

Yet in India, concerns related to costs, safety and misplaced priorities persist. Tomoyuki Nakano, the Director for International Engineering Affairs of Japan’s Railway Bureau, remained confident of ironing these out with some tweaks to the Japanese technology taking into account climatic differences, the possibility of electrical blackouts, as well as dust and other environmental conditions in India. He also pointed out that when Japan developed its first Shinkansen lines in the 1960s, it was a poor country as well that had required loans from the World Bank.

But what about the enormous software or cultural differences between Japan and India? Mr. Nakano was sanguine. “When we had Indians coming here (to Tokyo) for training, I noticed some of them were quite late. But after two weeks in Japan they became very punctual,” he concluded.

Pallavi Aiyar has reported from China, Europe, Indonesia and Japan. She is a Young Global Leader with the World Economic Forum

The new U.S. Fed Chairman is unlikely to opt for policies that might upset the President’s plan

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Five challenges in the Ahmedabad-Mumbai bullet train project

It is indeed a great beginning for India that the ground-breaking for the construction of the first bullet train between Ahmedabad and Mumbai is happening on 14 September at a function attended by Narendra Modi and Shinzo Abe, prime ministers of India and Japan respectively. Apart from being a major leap in infrastructure development in India, this project signifies the friendship and collaboration between the two countries.

The 534-km Rs1 trillion high-speed rail project that will operate trains with average speeds of 200-250kmph will be a game-changer in terms of inter-urban connectivity and establish India as a market for such technologies. Japan, which has matured in evolving such technologies and is seeking opportunities for investments, is providing a loan that would cover 80% of the estimated project cost at 0.5% interest, with a 15-year moratorium followed by a 35-year payback period. While it is of great value that we have both financial and technological support from Japan for building this line, there are multiple challenges that need to be overcome. I speak of at least five:

Route design which would include questions like:

- a) Detailed alignment choice, especially when it is over ground, keeping in view land acquisition challenges versus providing access to the population along the corridor. If the alignment goes closer to urban growth areas to provide access, there would be issues of land acquisition, pulling down buildings, possibility of destroying heritage structures etc.
- b) Location of stations: whether they should be the city centre connecting existing railway stations, or in an adjacent station, or periphery of an urban node. The trade-offs are providing better access and connectivity versus costs due to land and structures.

From a long-term point of view, being in the periphery of an urban node, apart from reducing costs, could help generate urban growth around the station, and even in shifting the centre of gravity of the urban area. In the short run, however, traffic ramp-up will take time. This needs to be mitigated through excellent feeder services. The specific location of the terminal station in Mumbai is still courting controversies. The Maharashtra government does not seem to be willing to give land in a major commercial growth node, as has been requested. Instead, it is suggesting that the station could be located in the land that belongs to the railways. This could have implications on the catchment at the Mumbai end.

- c) Number of stations: In general, there would be a demand for more stations. While this will increase the catchment, it could reduce the average speed due to higher number of stops. One way around this would be to have different service categories like fast (stopping at all stations) and super-fast (only at major cities).

It should be noted that the bigger catchment will be from the smaller cities that may not have access to airports. For example, while an Ahmedabad-Mumbai passenger may still consider air as a viable option, for the Anand-Mumbai or Ahmedabad-Vapi passenger, the high-speed train is a great boon. Having stations with connectivity to airports like at Ahmedabad, Vadodara and Mumbai will increase catchment of long distance air passengers who could then connect to the cities in this corridor and vice-versa.

Evacuation facilitation: At each station, it would be important to have fast and multiple means of evacuation, to increase the catchment and propensity to travel.

- a) To begin with, efficient bus services as well as accessible parking lots for private vehicles

should be provided.

b) In Mumbai and Ahmedabad, where metros are under construction, it would be important to provide seamless metro connectivity.

c) At major stations, where passengers could move to other trains, the transfer must be seamless.

Land acquisition: This will be a critical issue, especially where the alignment would veer off from existing railway lands. The challenges would be best addressed by the line going over ground, where the actual acquisition would be limited to the footprint of the pillars. Designs would have to be developed in such a way that the footprint is minimized. Experience from land acquisition for transmission lines and metro corridors would come in handy.

Human resource development: It would be important to train a large number of Indian engineers and managers for design, construction and operations at standards that would be essential for high speed rail, including for stringent safety standards. It would also be important to train Japanese senior management, who need to spend considerable time in India to train and oversee the required activity. The Japanese managers would need to be oriented towards Indian conditions and the prevalent professional culture. In recognition of this, as part of the project, a large training centre is being put up. Along the same lines, IIM Bangalore is setting up an India-Japan Study Center with the mission of improving India-Japan mutual understanding and complementary skill building in the domain of management including for infrastructure.

Future expansion: It would be useful to have a perspective on how the expansion of this line would happen. Once the proof of concept of High Speed Rail is established, there would be demands for expansion. In an earlier proposal, the line was actually to go beyond Mumbai to Pune, but was not found to be viable initially. Such visioning would be useful in bringing greater support from the government of Maharashtra.

G. Raghuram is director of Indian Institute of Management Bangalore.

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The new highways: on developing national waterways

As acquisition of land for national and State highways becomes scarce and the cost of construction of roads, flyovers and bridges goes up, the government is now exploring using water as a means of public transportation.

With the enactment of the National Waterways Act, 2016, the total number of national waterways is now 111. But providing infrastructure such as jetties, terminals, and navigational channels continues to pose a challenge.

Hence, the government has proposed an amendment to the Central Road Fund Act, 2000. The Central Road Fund (Amendment) Bill, 2017 implants 'national waterways' into the 2000 Act.

The Bill proposes using a part of the cess collected on high-speed diesel and petrol for the upkeep of the national and State highways for maintaining the infrastructure of the national waterways.

The Ministry of Road Transport and Highways, which tabled the Bill in July 2017 in the Lok Sabha, said national waterways provide a cost-effective, logistically efficient and environment-friendly mode of transport, whose development as a supplementary mode would enable diversion of traffic from over-congested roads and railways. It is argued that the waterways project deserves better regulation and development across the country.

In order to suitably develop national waterways, sustainable source of funding is imperative as budgetary support and funds from multilateral institutions are inadequate.

In a statement on objectives and reasons for the amendment, the Ministry said that "one of the sustainable sources of funding for the development of waterways is to earmark certain per cent of cess levied and collected on high speed diesel and petrol under the Central Road Fund Act of 2000". It has proposed to provide 2.5% of the cess on high-speed diesel and petrol for the development and maintenance of national waterways. This would accelerate the development of national waterways by utilising the funds generated by way of cess. It also offers incentives and certainty for the private sector to invest in the inland waterways transport sector.

At the current rates of levy of cess, about 2,000 crore per annum is estimated to be available for the development and maintenance of national waterways. The administration of the cess collected will also involve some expenditure. It is not possible to indicate the quantum of expenditure involved at this stage. However, the expenditure involved for this purpose would be met out of the budgetary provision of each year by the Ministry of Shipping, as approved by Parliament.

The new U.S. Fed Chairman is unlikely to opt for policies that might upset the President's plan

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Government for market borrowing to incentivize speedy execution of new urban missions**Government for market borrowing to incentivize speedy execution of new urban missions****Minister of Housing & Urban Affairs says SPV to tap market****Minister asserts urban missions doing well and targets will be achieved****Comprehensive review of JNNURM to further improve urban planning, execution****National Conclave of States for mid-term review and road ahead**

Ministry of Housing & Urban Affairs is considering market borrowings to incentivize speedy execution of urban infrastructure projects under various new urban missions launched over the last two years. This was stated by the Minister of Housing & Urban Affairs Shri Hardeep Singh Puri while addressing 'Public Affairs Forum of India' on challenges and opportunities of rapid urbanization here today.

Shri Puri said "To overcome the severe infrastructure deficit accumulated over long years, huge order of investments is required. To meet various contingencies and to ensure fund availability to meet the targets under new urban missions, we are thinking of mobilizing resources from the market. We have undertaken an assessment of requirement of funds till 2022 and likely flow of funds. To ensure assured fund flow, setting up of a Special Purpose Vehicle to tap the market is under examination. Once this idea is firmed up, we will take it forward in an appropriate manner".

The Minister assured that the Government led by Prime Minister Shri Narendra Modi will spare no efforts to realize a new Urban India and will work shoulder to shoulder with State and city governments in the true spirit of Team India. He further noted "These are happening times in India and Urban India is an integral part of this exciting and challenging journey. I am confident that success will be with the people of India".

Elaborating on the ongoing efforts to further improve urban governance, planning and execution, Shri Puri announced that a comprehensive evaluation of implementation and outcomes of Jawaharlal Nehru National Urban Renewal Mission (JNNURM) will be undertaken which will serve several purposes, it being the first concerted effort to make a difference in urban sector. He said "The terms of evaluation will cover the extent of realization of stated goals of JNNURM, an assessment of improvement in urban governance further to implementation of reforms, identification of lacunae and reasons for shortfall in physical and financial progress. This evaluation will provide useful guidance to

city and State Governments in the context of current thrust on urban rejuvenation”.

JNNURM was implemented during the period 2005-14, before it was wound up by the previous government. This government, however, continued to finance some of the incomplete projects based on certain criteria, to enable their completion.

Referring to the impact on the ground of new urban missions, Shri Puri said that though the new Missions like Smart City Mission, AMRUT and Pradhan Mantri Awas Yojana (Urban) were launched only a little over two years back, substantial work is being executed on the ground with hundreds of projects under implementation. He asserted that visible impact will be visible in the next few months and expressed confidence that targeted outcomes will be achieved within given time frames. To prove his point, the Minister gave an account of performance during 2014-17 and the earlier ten years.

Elaborating on the paradigm shift in urban development approach of this Government, the Minister said “The city level action plans for improving urban infrastructure under different new missions have not been drafted in Delhi. They all emanated from the ground level and are collective expression of the aspirations of the citizens and city governments. Ownership of these plans is with them and not with Delhi. So, they have the obligation of ensuring their timely implementation”.

Shri Puri announced that a National Conclave of States and Union Territories will be organized for a high level mid-tem review with Ministers of the progress of various urban missions, for sharing of experiences for mutual benefit and a structured discussion on speeding up of implementation to meet time bound targets.

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The Ghazipur landfill collapses, another catches fire, and no one wants a dumpsite in the backyard. Where must our solid waste go?

On September 2, an avalanche of garbage at Ghazipur keeled over killing two people | Photo Credit: [Shanker Chakravarty](#)

A defiant mound — lush with grass as on a golf course — rises amidst 150-foot-high mountains of rotting garbage that constitute Delhi's most infamous landfill, in Ghazipur. At the foot of the mound is a stout, rectangular transformer — a 'demonstration project' — meant to show that landfill gas (a mix of methane and carbon dioxide) can be squeezed out of the garbage and be used to produce electricity.

For decades now, commuters on the highway connecting Delhi to Meerut would have been forgiven for mistaking the giant brown heaps for a mountain range. But locals know that it is a hulk of trash that grew at an average of about 3,000 tonnes a day every year — until this month, that is.

On September 2, an avalanche of garbage keeled over onto a road and with its momentum broke through a boundary wall pushing cars and motorcycles into an adjoining drain. Two people died and at least seven were injured in this accident.

"It was a massive sound, like an explosion," said Ram Manohar, who works at one of the effluent treatment plants built to convert some of the waste into biogas, "I ran to see what happened and the next thing I saw was a car floating in the drain."

To Shanta Kumari, who lives in the nearby slum, the disaster was imminent. She and her three sons have lived in one of the slums surrounding the landfill for several years. They have now got used to the stench, says Shanta, although it can get particularly overwhelming during the rains. "The stench apart there have been several fires that billow out during the summer. We've lodged several complaints but nothing has happened and we now accept it as a part of our life."

The bulk of the waste in the landfill being organic means that it's a potent source of methane and is inflammable, a fact that's well known to everyone — from government authorities to activists.

Delhi has other landfill sites at Bhaswal, northwest of the city, and it's so prone to fires that the Delhi Fire Services has engines on standby and positioned close enough to quickly douse it. Delhi isn't the only city that hosts deadly landfills.

Deonar, Mumbai's largest and oldest dumpyard, caught fire multiple times last year and required firemen for weeks; it spiked pollution levels to nearly twice that of Delhi. The Central Pollution Control Board has reported that waste from India's cities has crossed 1,42,870 (1.43 lakh) tonnes per day, of which a substantial 12,858 tonnes is not even collected. Of the 91% (1.3 lakh tonnes) collected, around 65,000 tonnes is dumped or disposed off in the most unscientific and unhygienic manner. Only 23% is being treated while 27% is dumped in landfills.

Energy from waste

A waste-to-energy plant commissioned in Ghazipur works sub-optimally because it requires that there be no solid waste in the refuse before treatment.

In an earlier interview, Ravi Agarwal, Director, Toxics Link, an organisation that works on waste management problems, had said that unless basic steps such as segregating waste at source were undertaken, it would be impossible to deal with Delhi's garbage woes. Professor Manoj Datta

of the Department of Civil Engineering, IIT-Delhi, in the aftermath of the recent disaster said that the 'stability of the landfill' could be increased by flattening the slopes, strengthening the top and removing leachate and gas.

Thirty-five years ago, this 80-acre shrine to garbage was an empty, featureless outback of Delhi. A fish and poultry market, a slaughterhouse, a vegetable and flower market predate the dumpsite and in the eyes of the municipal corporations, was a logical dumping ground for a rapidly-consumerising Delhi. In the late 1980s, as the trucks started to stream in — with piles of refuse from the markets as well as residential colonies of east Delhi — Mohammed Nazir and his schoolmates discovered that it became increasingly hard to host a decent game of cricket here.

"The ball would always get stuck in the trash and after a while it became impossible to ignore the stench," said Nazir, who's now a 45-year-old fish retailer at Murga Mandi, the generic name for the assortment of sprawling retailers that dominate the area.

As Nazir grew, so did the line up of trucks and eventually the landfill, which was stipulated to grow no more than 70 feet, but breached the limit in 2004. There's also an informal economy that subsists around the landfill: waste collectors, operators of trash-skimming equipments, truck drivers who ferry the trash.

For Kumari, living near a dumpsite that receives nearly a third of the city's garbage is a small price to pay because it pays her bills. Her sons climb the mounds of trash everyday for the slightest object of value — iron parts, electronic scrap, plastic — that are then sold for recycling. "Were this to go away, how will we eat?" she asks.

Foiled plan

After the accident, Anil Baijal, Delhi's Lieutenant Governor decreed that no more fresh garbage was to be dumped at the Ghazipur landfill; the convoy of trucks has slowed down to a trickle. Mirza, who works as a watchman at the Ghazipur dump, says that a handful of trucks continue to come in because the government's plans to have garbage dumped in an alternate location has run into stiff opposition from locals.

When disaster strikes

A waste-to-energy plant by the Jindal group in south-east Delhi's Okhla belt was stalled for years because residents in the vicinity complained that it wasn't using proper incineration technology and that the fumes were triggering illnesses.

Even as Delhi's waste management problems balloon, Delhi denizens' protests against any waste-to-energy plant or landfill coming within sniffing distance of their homes, has meant that authorities only firefight when a disaster strikes rather than implement long-term garbage-management plans.

The government amended solid waste management rules last year, mandating that all establishments take charge of ensuring that waste is segregated and waste collectors be absorbed into formal networks. "This requires a concerted government effort but given that different political parties control different wings of government, and Delhi's unique statehood means that it's extremely hard to work on long-term solutions," said a top official at the CPCB, who didn't want to be named.

The green mound was also once part of the dump that has now been flattened out and has its waste dredged to make landfill gas and run a micro power plant. In November, the government will begin an attempt to use the solid waste from the landfill as filler in the construction of a highway

connecting Delhi and Meerut, a plan that was made public in the aftermath of the accident. But “it’s too expensive and I doubt that this mountain heap will go away,” said Anoop Kumar, an engineer who works at the treatment plants.

Jaggi Vasudev’s Rally for Rivers claims they will, but this is not based on the most nuanced science

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Land use conversion and climate change can make a deadly combination for Mumbai

The coastal landscape of Mumbai has changed drastically in the last few years | Photo Credit:

[AP](#)

For the second time in a little more than a decade, rain and floods brought Mumbai, India's commercial capital, to a grinding halt. The city recorded nearly 300 mm of rain on August 29, one of the heaviest spells in the city's history. It was much lower than the all time single-day record of 944 mm of July 2005, but it was enough to bring the city to its knees.

The media reported on the impact on citizens, the failure of the local administration to first anticipate and then deal with the situation. While this remained focused primarily on the causes of flooding, there was another series of reports on larger phenomenon at play: Global warming and changing land use in the city. This makes a deadly combination indeed.

The coastal landscape of Mumbai has changed drastically in the last few years — satellite imagery following the August deluge shows, for instance, how mangrove forests in areas like Thane, Malad, and the Manori creek, have been lost or encroached upon. The new airport that was approved in Navi Mumbai a few years ago will destroy nearly 160 hectares of mangroves. The initial proposals by the Mumbai Metropolitan Region Development Authority had suggested the reclamation of more than 20 sq.km. of the city's salt pans for housing and other projects. The desire for more land is clearly jettisoning the security of the city and this is only expected to grow more pronounced as weather patterns become more extreme and also more uncertain with climate change.

Capacity to cope

There are two threads of discussion that are relevant here. On the positive side is the realisation, at least to an extent, of the importance of ecosystems like the mangrove. This is reflected in the creation in Maharashtra of a mangrove cell to protect and regenerate mangroves. Mumbai has some very good patches of mangroves, two of which (in Vikhroli and Airoli in Navi Mumbai) were included in a list of 12 important mangrove systems in India recently released by the Mangrove Society of India. While protection of the mangroves is unlikely to completely prevent the kind of events Mumbai has seen recently, the move will certainly help ensure a better capacity to cope. A 2009 study by scientists at the University of Delhi and Duke University in the United States showed, for instance, that villages with wider mangrove belts suffered relatively lesser damage during the 1999 'super cyclone' that ravaged the Odisha coast and killed an estimated 10,000 people.

A study published in May 2017 in the journal *Hydrobiologia*, pointed out that in the U.S., wetland coastal protection services provide an estimated \$23.2 billion per year against economic losses as well as deaths associated with major storm events.

Huge challenges

The bigger challenge in India comes however from the overarching thrust given to industrial expansion and infrastructure development.

This is starkly visible in the NITI Aayog's recently-released 'Three year action agenda 2017-18 to 2019-20'. While the action agenda for coastal regions does list issues surrounding coastal zone management and regions vulnerable to cyclones, flooding, earthquakes and tsunamis, these are included only as broad generalities. The major thrust, clearly, is on exploiting the land and the

resources along the coasts for aggressive economic growth, suggesting as it does port development as part of the Sagarmala programme, easing of sea-river movement, a massive thrust to tourism development, creation of a 2500 km long East Coast Economic corridor running from Visakhapatnam to Chennai, and the creation of 14 Coastal Employment zones based on the Chinese model of Special Economic Zones.

Conservation and protection are clearly not a priority — and this is a matter of serious concern, not just for Mumbai but for regions all along India's coastline. The NITI Aayog report itself notes that nearly 250 million people in the country live within 50 km of the coastline. And no amount of infrastructure development or economic growth will ensure their protection as the case of Mumbai has shown not once, but twice in little more than a decade.

The writer researches issues at the intersection of environment, science, society, and technology.

Jaggi Vasudev's Rally for Rivers claims they will, but this is not based on the most nuanced science

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Indus water talks make no headway

The latest round of talks between India and Pakistan on the Indus Waters Treaty has ended without any agreement, the World Bank has said, while asserting that it will continue to work with complete impartiality to resolve the issues in an amicable manner.

Islamabad's objection

Amid a chill in bilateral ties, the second round of discussions between India and Pakistan on the Ratle and Kishanganga hydroelectric projects, over which Islamabad has raised objections, took place at the World Bank headquarters here on September 14 and 15 under the aegis of the World Bank.

"While an agreement has not been reached at the conclusion of the meetings, the World Bank will continue to work with both countries to resolve the issues in an amicable manner and in line with the Treaty provisions," the World Bank said in a statement.

"Both countries and the World Bank appreciated the discussions and reconfirmed their commitment to the preservation of the Treaty," it said after the conclusion of the Secretary-level discussions between the two countries on the technical issues of the Kishenganga and Ratle hydroelectric power plants within the framework of the Indus Waters Treaty.

The World Bank remains committed to act in good faith and with "complete impartiality and transparency" in fulfilling its responsibilities under the Treaty, while continuing to assist the countries, it said in its statement.

The Indus Waters Treaty was signed in 1960 after nine years of negotiations between India and Pakistan with the help of the World Bank, which is also a signatory.

World Bank's role

The World Bank's role in relation to the "differences" and "disputes" is limited to the designation of people to fulfil certain roles when requested by either or both of the parties.

The Indian delegation was led by the Union Water Resources Secretary Amarjit Singh.

It also included India's Indus Water Commissioner and representatives from the ministry of external affairs, power, and Central Water Commission.

The Pakistani delegation was led by Secretary, Water Resources Division, Arif Ahmed Khan along with Secretary of Water and Power Yousuf Naseem Khokhar, High Commissioner of Indus Waters Treaty Mirza Asif Baig and Joint Secretary of Water Syed Mehar Ali Shah.

The last round of talks were held on August 1, which the World bank said were held in a spirit of goodwill and cooperation.

World Bank says it will work with both countries to resolve the issues amicably

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Why does World Bank want to broker Indus water talks between India and Pakistan

Written by Bimal N Patel

The implementation of the Indus Water Treaty (IWT) has acquired new momentum owing to political, legal and economic developments in India and Pakistan. Two influential issues govern the future of this Treaty in ensuring its sustainable implementation and a role for the World Bank.

First, let us see World Bank's role. David E Lilienthal, the head of the Tennessee Valley Authority visited the Indus region on an invitation by Prime Minister [Jawaharlal Nehru](#) in August 1951. He recommended the World Bank to facilitate negotiation of the Indus Water Basin to which both countries agreed.

The World Bank offered its good offices and mediation in 1952. Collective efforts on the part of India and Pakistan led to the IWT in 1960. The Permanent Indus Commission (PIC) was established the same year. During the 1960s, although the World Bank participation continued, it was the Commission which dealt with differences between the two parties. The Bank was signatory to several provisions, responsible for the operation of the Indus Basin Development Fund, including the sharing of canal waters during the transition period under Annex H as well as its role of conflict resolution under Annex F and G. Commission meetings between 1960 to 1966 did not mention the Bank even once; the Commission implemented the Treaty and managed the Indus River. Subsequently, the Bank effectively withdrew in 1970 leaving both parties to rely on the Commission for smooth Treaty implementation.

The IWT has been in force for decades without any provision for suspension or termination, nor withdrawal. It is silent on denunciation — meaning, it cannot be unilaterally denounced, except if India and Pakistan intend to admit such a suggestion—as well as withdrawal, and in fact aims at establishing a perpetual water-sharing regime. Because it deals with sharing international river waters, it is expected to indefinitely remain in force.

India's usage of the assigned rivers are one-fifth of the total flow of the Indus Basin, while Pakistan's usage is four-fifths.

The implementation history of the Treaty shows that Pakistan has been using the argument that because it is a downstream riparian state, it must have unrestricted access to water by the upstream riparian state, that is India. This means that India can be asked to explain its actions, thereby putting her in a defensive position. The water discourse in Pakistan is increasingly projected as a flashpoint, where the political-military class successfully employs its resources. The people are increasingly beginning to believe that Pakistan is being deprived of its legitimate right to water.

But this does not take into account, India's legitimate rights, or the expectations of the people of Jammu & Kashmir to rightfully use its resources.

The IWT envisages a specific and limited role for the World Bank. The Treaty allows for the provision of a Neutral Expert to deal with differences in case of disagreement between India and Pakistan, which means that there is no place for the Bank's interventionist or self-assumed mediatory role. In fact, the Bank's role is immaterial or ceremonial in any potential arbitration.

The Treaty Annex says that the Bank's President can nominate a person to draw lots to facilitate arbitration umpires when India or Pakistan fail to agree.

That is why, in the present context, the Bank's attempt to both appoint a Neutral Expert (on India's request to arbitrate differences with Pakistan), as well as a Court of Arbitration (on Pakistan's request to arbitrate differences with India), can certainly attract a certain abuse of its role.

A quick reading of Article IX in the Treaty makes it amply clear that parallel and simultaneous processes of jurisdiction for settlement of differences and disputes between parties is legally untenable.

I believe that the World Bank's decision to "pause", in December 2016, or "lift the pause" of its earlier decision is a clear indication that the Bank wants to get actively involved in implementing the Treaty. This uncalled-for role of the World Bank cannot serve the long-term interest of both parties, except vested interests emanating from constituencies in both nations as well as the World Bank.

This uncalled-for notification of the World Bank is against the spirit of international law, principles, general and specific treaty interpretations, principles of customary international law and settled understanding of State practices in international law.

The Bank had a role before 1970 during the transition period of operations. Even during the 1960s, differences were effectively and amicably dealt by the Indus Waters Commission. Only the wise leadership of both countries can properly settle differences bilaterally without giving the World Bank any leeway in the implementation process.

Secondly, can and should the Indus Waters Treaty be denounced, terminated, or its implementation suspended or renegotiated? These options are available under international law and even specifically mentioned in the IWT itself.

Both countries can withdraw from the IWT any time and cease to abide by its terms, on the grounds of fundamental change of circumstance. Now, it is clear that these fundamental changes have, indeed, taken place, but the truth is that it is almost impossible to exercise such an option.

A third option is to suspend the fulfilment of obligations. However, this would deprive another's right to equitable share and may even lead to the labelling of a State intentionally committing a wrongful act. It may create further problems, and even prevent Treaty resumption. On the other hand, both parties may continue their Treaty relationship even when it is suspended, allowing them both to renegotiate it.

Can India or Pakistan invoke the principle of "impossibility of performance" under IWT? Certainly, this is a principle that is admissible in international law, but on the ground there seems to be limited scope that is established and uncontested. Indian courts as well as courts in other countries will probably not be inclined in favour. It is also likely that states will take counter-measures in this situation.

The point is that the fate of the Indus Waters Treaty cannot be secured if cross-border terrorism continues or one party takes more than its share of the waters or threatens for uncalled-for dispute mechanisms or denies the legitimate expectations of people of Jammu and Kashmir in asking for its share of water. All this under the garb of moral righteousness and preservation of the Treaty's mere sanctity.

Article 12(3) expressly provides the possibility for the Treaty to be modified from time to time. Hence, the time has come for both parties to initiate a modification of the Treaty's articles and ensure only bilateral processes without third party intervention.

The revision of the Treaty in good faith will usher in a new era of bilateral relations and take into account changes in fundamental circumstances. The competition for water in the Indus Waters Basin is much more today than in the 1950s. Therefore, claims and counterclaims only magnify tension on both sides. The dependency of both parties has increased, so even on technical, resource-allocation and utilisation grounds, the time is now ripe for Treaty renegotiation. Despite the disinclination to do so in certain sections in India and Pakistan to do so, the renegotiation of the political, economic and social interests of the Indus Water Regime must begin soon.

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PM dedicates Sardar Sarovar Dam to the nation; attends closing ceremony of Narmada Mahotsav at Dabhoi**PM dedicates Sardar Sarovar Dam to the nation; attends closing ceremony of Narmada Mahotsav at Dabhoi**

The Prime Minister, Shri Narendra Modi, today dedicated the Sardar Sarovar Dam to the nation. The occasion was marked by prayers and chanting of hymns at the Dam at Kevadia. The Prime Minister unveiled a plaque to mark the occasion.

Later, the Prime Minister visited the construction site of the Statue of Unity, an iconic structure dedicated to Sardar Vallabhbhai Patel, at Sadhu Bet, a short distance from the Sardar Sarovar Dam. He was given an overview of the progress of work at the site.

At a large public meeting in Dabhoi, the Prime Minister unveiled a plaque to mark the laying of foundation stone of the National Tribal Freedom Fighters' Museum. The occasion also marked the closing ceremony of the Narmada Mahotsav, which generated awareness about the River Narmada, in various districts of Gujarat.

Speaking on the occasion, he said the huge gathering shows the respect that people have for Maa Narmada. On the occasion of Vishwakarma Jayanti, he said that he salutes all those who are working to build the nation. Let us leave no stone unturned to build a New India by 2022, the Prime Minister exhorted.

The Prime Minister recalled Sardar Patel's vision of the dam. He said that both Sardar Patel and Dr. Babasaheb Ambedkar gave a lot of emphasis to irrigation and waterways.

The Prime Minister said lack of water resources has been a major impediment to development. He recalled visiting the border areas in the past, when BSF jawans did not have enough water. We brought Narmada waters to the border areas for the jawans, he said.

The saints and seers of Gujarat have played a very big role in the making of the Sardar Sarovar Dam, he said. The waters of the River Narmada will help citizens and transform lives, he added.

The Prime Minister said that in the western part of the country, there is water shortage, and in the eastern part, there is power and gas shortage. He said the Government is working to overcome these shortages, so that India scales new heights of development.

The Prime Minister said the Statue of Unity would be a fitting tribute to Sardar Patel, and would draw tourists from all over. He recalled freedom fighters from tribal communities, who fought against colonialism.

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Giant sea snail plan to rescue Barrier Reef

A giant starfish-eating snail could be unleashed to help save the Great Barrier Reef, officials said on Monday, with a trial under way to breed thousands of the rare species.

Predatory crown-of-thorns starfish, which munch coral, are naturally-occurring but have proliferated due to pollution and run-off at the struggling World Heritage-listed ecosystem. Their impact has been profound with a major study of the 2,300-km long reef's health in 2012 showing coral cover halved over the past 27 years, with 42% of the damage attributed to the pest.

Hunting by scent

Now, Australian Institute of Marine Science (AIMS) research has shown they avoid areas where the Pacific triton sea snail — also known as the giant triton — is present.

The snails, which can grow to half a metre, have a well developed sense of smell and can hunt their prey by scent alone.

Research showed they were particularly fond of crown-of-thorns, but only eat a few each week, and with the snail almost hunted to extinction for their shells, there are not many left.

This led the government to announce on Monday funding to research breeding them. "The possibilities the triton breeding project opens up are exciting," said Queensland federal MP Warren Entsch. "If successful, this research will allow scientists to closely look at the impact of giant tritons on crown-of-thorns behaviour and test their potential as a management tool to help reduce coral lost to outbreaks." Giant tritons held at AIMS have laid numerous egg capsules. But they are so rare, almost nothing is known about their life cycle.

Jaggi Vasudev's Rally for Rivers claims they will, but this is not based on the most nuanced science

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It is time to rethink the 'big dams' model of development

The scientific imagination that put big dams at the centre of a national development paradigm belongs to a century long gone. The prevalent ideology around the world at the time when dams such as the Sardar Sarovar were envisioned have undergone a sea change in the decades it has taken to bring it to conclusion.

The original thought behind building dams to harness the power of rivers was the promise of clean, pollution-free, hydropower that would bring electricity to many districts in India. But this outlook was changing even in the 1950s. Nehru himself, who famously called dams 'temples of modern India' in 1954 while inaugurating the Bhakra Nangal had changed his mind by 1958, observing that we in India might be suffering from "the disease of gigantism" and rooted for smaller irrigation projects. In a letter to chief ministers in 1957, Nehru had pointed out the need to balance development projects with the need to protect the environment.

Internationally too, there have now been many attempts to do away with large projects that disrupt not just the lives and livelihoods of the people who live in these areas, but also aid the destruction of the ecosystem of the region. According to the non-profit organisation American Rivers, over a thousand dams have been removed till date in the USA alone. An article published in the Scientific American outlined the problems of water quality and ecosystems that came in the wake of building even modest sized dams. The near extinction of the fish such as the Atlantic salmon and sturgeons has been directly linked to the presence of dams on their migration routes. In fact several studies have recognised the building of dams as having the most substantial impact on the destruction of riverine ecosystems. The building of the Aswan Dam in Egypt has been blamed for the erosion of the Nile River delta, deterioration of agriculture in the area, and the increased incidents of parasitic diseases such as schistosomiasis.

The other major problem with such large projects is the problem of rehabilitation of displaced people. This is, of course, not counting the fact that the land that tribal communities and others have occupied for centuries is not just something that can be measured in acres and rupees. The cost of history and memory that lies in land and ancestral property can never be reimbursed.

India's record of adequately rehabilitating people displaced by such projects is abysmal. Around 50 million people have been displaced due to development projects in India. In spite of this massive number of affected people, there is a glaring lack of a formal policy of rehabilitation and resettlement for displaced people. Given the terrible status of records of land titles, and the worse records of those who don't own land such as landless labourers, it is almost always the case that many displaced people are never considered for rehabilitation. According to the South Asia Network on Dams, Rivers and People (SANDRP), many people displaced by the Bhakra project are yet to be rehabilitated at all.

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Do we really need interlinking of rivers?

Interlinking of rivers is a very expensive proposal. It has huge adverse environmental impacts on land, forests, biodiversity, rivers and the livelihood of millions of people. It is a socially disruptive proposition. It will not only add to climate change impact (destruction of forests means destruction of carbon sinks, and reservoirs in tropical climate are known sources of methane and carbon dioxide), but will also reduce our capacity to adapt to climate change.

Take, for example, the Ken-Betwa link which is the government's top priority. The link will facilitate export of water from drought-prone Bundelkhand to the upper Betwa basin, as the detailed project report (DPR) makes clear. The Ken-Betwa link's hydrology is effectively a state secret, so there is no way to check if the claim of Ken river being surplus is valid. There has been no credible environmental impact assessment of the link and no public hearings in canal and downstream affected areas. The link's environmental management plan is still being prepared.

The Ken-Betwa link threatens about 200 sq. km of the Panna tiger reserve, and with it the Ken river and large parts of Bundelkhand. Yet, it does not have an environment clearance, a final forest clearance, and its wildlife clearance is being scrutinized by the Central-empowered committee appointed by the Supreme Court. In fact, both forest and wildlife clearance recommendations are under the condition that the power project will be taken out of the forest/protected area, but the environment clearance recommendation assumes the project will be inside the forest/protected area. So even that is invalid.

The government justifies the Ken-Betwa link, and indeed the river interlinking project as a whole, by saying that it will provide irrigation, water supply, hydropower and flood control. But we need to understand that most of India's water benefits, including irrigation, come from groundwater. In fact, in the past two-and-a-half decades, the net national irrigated area from big dams has decreased by about 1.5 million hectares from a peak of 17.79 million ha in 1991-92, according to government data. But in the same period, India's total irrigated area has gone up—primarily due to groundwater. Groundwater is our water lifeline and whether we like it or not, whether we want it or not, groundwater is going to remain our water lifeline for decades to come.

However, our current use of groundwater is not sustainable. The focus of our water resources development should be on how the groundwater lifeline can be sustained. Will Interlinking of rivers help in this? No, since Interlinking of rivers entails a large number of dams that will lead to destruction of rivers, forests, wetlands and local water bodies, which are major groundwater recharge mechanisms.

So as far as irrigation is concerned, it seems the river interlinking project is likely to create more problems than benefits. The same is true for water supply.

As far as hydropower is concerned, it is clear that large hydropower projects are no longer a viable option in India. The power minister has repeatedly said in Parliament over the last two years that hydropower projects of over 11,000MW are stuck due to lack of finances and questions over viability. The chief minister of Himachal Pradesh has stated that private developers are exiting the sector as they consider the projects to be non-viable. The situation in Sikkim and Arunachal Pradesh is similar.

It costs over Rs10 crore to produce one megawatt of hydropower, which in turn produces less than four million units of electricity. This means the per unit cost of power from such projects is in excess of Rs8 per unit, when there are no takers for power that costs even Rs3 per unit. In any case, Interlinking of rivers will be needing more power to lift the water than what it is likely to

produce.

Can the river interlinking project flood-proof the flood-prone river basins? While theoretically, a large reservoir can help moderate floods in the downstream areas, our experience on the ground doesn't inspire as much confidence. For example, heads of government, state officials, and the Comptroller and Auditor General have on numerous occasions pointed out that big dams such as the Ranganadi dam, the Damodar dams, the Farakka and Bansagar dams, and the Hirakud dam have brought avoidable flood disasters to Assam, West Bengal, Bihar and Odisha, respectively.

The other problem with the river interlinking project is that of storing large quantities of waters. Most of the sites suitable for the big reservoirs are in Nepal, Bhutan and in the North-East—and each one has made clear their opposition to big storage reservoirs.

If the water cannot be stored in big reservoirs during the monsoon, which is when some rivers are flooded, then the other option is to transfer the water to deficit basins during this time. But when the Brahmaputra is in floods, so is the Ganga and all the rivers through which the water needs to be transferred, including the Subarnarekha, the Mahanadi, the Godavari, the Krishna, the Pennar, and so on. Why should these rivers, that are already facing floods, receive more water?

There is no doubt that if we can store water during the monsoon, we can make it available in the post monsoon months. But the water resources establishment sees big dams as the only storage option. Yet, the biggest, cheapest, most benign, possibly fastest and most decentralized storage option for India is the groundwater aquifer.

In other words, what India needs is not interlinking of rivers but something else to achieve water, agriculture and livelihood security.

Himanshu Thakkar is coordinator of South Asia Network on Dams, Rivers and People.

Comments are welcome at theirview@livemint.com

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ONGC discovers oil in Arabian sea

State-owned Oil and Natural Gas Corp. (ONGC) has made a significant oil discovery to the west of its prime Mumbai High fields in the Arabian sea, a senior official said on Wednesday.

The discovery in the well WO-24-3 is estimated to hold an in-place reserve of about 20 million tonnes, he said. Mumbai High, India's biggest oil field, currently produces 205,000 barrels of oil per day (just over 10 million tonnes per annum) and the new find would add to that production in less than two years time.

"In all, nine objects or zones were tested and all of them were found to be hydrocarbon bearing. The last object tested flowed 3,300 barrels of oil," he said.

Further appraisal

ONGC is carrying out a further appraisal of the discovery and has intimated upstream regulator Directorate General of Hydrocarbons.

"This is a mid-sized discovery but a significant one," the official said.

The new find, which comes almost 50 years after ONGC began production in Mumbai High, will help the company maintain production levels from the basin for a longer time than currently estimated.

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Narmada dam: Public finance, public play

Optics is as air for politicians. It is no different for Prime Minister Narendra Modi and what is commonly known as the Narmada Dam. But even air can sometimes get dense with rhetoric.

On 17 September, Modi inaugurated the Sardar Sarovar Dam, the largest project of the Narmada, or Sardar Sarovar Project, near Gujarat's border with Maharashtra. It was Modi's birthday.

It also provided a perfect gift to Gujarat ahead of elections to its assembly that must be conducted before its term ends next January.

"We faced every opposition for this project," an article in *Mint* quoted Modi as saying at a public meeting after the event. "The World Bank decided not to fund Sardar Sarovar Dam Project after some activists propagated that the project flouted some environmental rules. World Bank or no World Bank, the people of this country had faith in us and it is due to their determination that this project has been completed."

It is correct that activists complained to the bank about matters of shabby resettlement and rehabilitation practices and environmental degradation. Indeed, activists are still complaining. But the fact is that the World Bank conducted its own survey before it stopped payment of the remainder of its commitment for the \$300 million that, with other lenders, it had allocated for the Sardar Sarovar Dam.

In the 1995 report, *Learning from Narmada*, it highlighted the project's stated design to irrigate nearly 2 million hectares of arid land, and the "promise" of drinking water for 30 million people in drought-prone areas, besides electricity for agriculture, urban areas and industry. "But they threaten the livelihoods of more than 140,000 people in the areas to be flooded by the Sardar Sarovar Dam and to be affected by the building of canals. And they may have negative environmental consequences," the report stated.

The bank's independent review was completed in June 1992. The review "found that the resettlement and environmental aspects of the projects were not being handled in accordance with bank policies". Thereafter the bank "made its continuing support for the dam contingent on the borrower's achievement of performance standards for resettlement and economic rehabilitation of displaced people, and for environmental protection. But in March 1993, the bank cancelled the remainder of its loan for the project at the request of the Indian authorities". The project continued mainly with government funds.

Displacement, resettlement and rehabilitation issues continue to dog the project. Gujarat remains the greatest intended beneficiary of the multi-state Narmada project after Madhya Pradesh in terms of increased irrigation; and after Madhya Pradesh and Maharashtra in hydroelectricity. However, the bulk of the displaced along the Narmada river are in Madhya Pradesh, with the overall project's ambit of 30 dams.

Activists, especially of the Narmada Bachao Andolan, have maintained that raising the Narmada Dam to its current height of 138.7 metres from its mid-2000s height of 121.92 metres would affect 200,000 people in Madhya Pradesh as more areas were submerged (The decision to raise the height was taken by the apex Narmada Control Authority on 12 June 2014, after Modi became Prime Minister). Indeed, as recently as February, the Supreme Court proposed setting up a three-member committee to review compensation and rehabilitation and resettlement issues for the project-displaced in Madhya Pradesh, Maharashtra and Gujarat.

As for the people of India and their “faith” in the project, it’s really a matter of public finance. In 2012, when Modi was the Bharatiya Janata Party (BJP) chief minister of Gujarat, there was even some celebration in the state over a high-level committee of the central finance ministry—a Congress-led one—recommending increased outlay in the 2012-17 Five-Year Plan to boost Gujarat’s Narmada-related canal-building in Kutch, Saurashtra and northern Gujarat.

In March 2015, the BJP government admitted in Gujarat’s assembly that the extent and speed of the construction of canals was wholly inadequate, but that’s another story inundated by the dam’s inauguration. As is the fact that the 2012-2017 Plan document, ‘Faster, More Inclusive and Sustainable Growth’ actually contains sharp criticism of big dams.

There are numerous instances of official misdirection to celebrate harnessing Narmada’s bounty. But meanwhile, there’s another celebration. The BJP government of Madhya Pradesh has planned a Jal Mahotsav—grand festival of water—to run from October to January along the Narmada in the Hanumantiya area. Visitors will be able to partake in luxury camping activities, yoga, and water sports on a part of the Narmada, the Indira Sagar reservoir, that contains numerous submerged villages and (once) vast forests.

Sudeep Chakravarti’s books include Clear.Hold.Build: Hard Lessons of Business and Human Rights in India, Red Sun: Travels in Naxalite Country and Highway 39: Journeys through a Fractured Land. This column, which focuses on conflict situations and the convergence of businesses and human rights, runs on Thursdays.

Respond to this column at rootcause@livemint.com

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PM to lay foundation stone of STP to be built at Varanasi under Namami Gange Programme**PM to lay foundation stone of STP to be built at Varanasi under Namami Gange Programme**

Prime Minister Shri Narendra Modi will lay the foundation stone of a 50 MLD Sewage Treatment Plant (STP) based on Hybrid Annuity-PPP model in Ramana in Varanasi on September 22, 2017. This is the first time ever that Hybrid Annuity-PPP model is adopted in sewage sector. It is a major step forward in realising the dream of Nirmal Ganga under Namami Gange programme.

The work to construct, operate and maintain the 50 MLD STP in Varanasi has been awarded to a consortium led by Essel Infra Projects Limited at an estimated cost of Rs 153.16 crore.

The Government of India had accorded Cabinet approval to implement the Hybrid Annuity based PPP model with 100% central sector funding. Under this model, the development, operation and maintenance of the STP will be undertaken by a Special Purpose Vehicle (SPV) at the local level. As per this model, 40% of the Capital cost would be paid during construction while the remaining 60% of the cost will be paid over the life of the project as annuities along with operation and maintenance cost (O&M) expenses for the next 15 years.

One of the most important features of this model is that both the Annuity and O&M payments are linked to the performance of the STP. This will ensure continued performance of the assets created due to better accountability, ownership and optimal performance.

Samir/jk

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Is the Sardar Sarovar Dam boon or bane?

LEFT

There is as yet no credible assessment of the costs, benefits and impact of the project

Himanshu Thakkar

To assess whether the Sardar Sarovar Project (SSP) is a boon or bane, we need to have a credible assessment of all the costs, benefits and impacts once the project is completed.

First, the project is still incomplete (even after downscaling the canal network by about 18,000 km), as per Gujarat government figures, with over 30,000 km of canals yet to be completed; the Garudeshwar Dam downstream from the SSP is still under construction (without any social and environment impact assessment). Second, there is as yet no credible assessment of the costs, benefits and impacts of the project. But let us take an overview of the key issues.

Not going to plan

The basic justification offered for the SSP by the Gujarat government from the time of the Narmada Water Disputes Tribunal in the 1970s was that there is no alternative to SSP waters for the drought-prone areas of Kutch, Saurashtra and north Gujarat. Funnily, all the incomplete canal network of the project is in these very regions, while in the water-rich and politically-socially-economically powerful central Gujarat region (excluding the eastern tribal belt) the canal network was completed long ago and the people have been enjoying full use of the water, way beyond their share in the original SSP plans. So, the SSP's basic objective is far from achieved.

Social and environmental impacts have gone far beyond what was estimated at the outset when the project was cleared in the late 1980s. Rehabilitation of even the submergence-affected population is about 80% incomplete, but the Prime Minister, on September 17, 2017, his birthday, declared the project complete! One of the most glaring aspects of this episode is that even the highest judiciary of the country could not assure that the displaced population got a just rehabilitation as required by law.

There are many other dimensions of the impacts of the project. For example, the 150-km stretch of the Narmada downstream from the dam is now dry most of the year and the claim of 600 cusecs (cubic feet per second) being released not immediately downstream but several kilometres from the dam is not supported by any clinching evidence. In any case, that quantum was not the result of any participatory assessment, and is not sufficient to stop even salinity ingress, as was seen in the last several years. The livelihood of at least 10,000 families depending on the Narmada estuary stands destroyed, without any one talking about any rehabilitation or compensation. Similarly, there is no rehabilitation for all the other categories of people displaced by the dam.

Independent review a must

Incidentally, the Sardar Sarovar reservoir could not be filled, and even the extent to which it was filled (up to a maximum of 129.68 m against the full reservoir level of 138.68 m) was possible only by stopping all power generation at the River Bed Power House for almost two monsoon months, and by reducing power generation at the upstream Indira Sagar and Omkareshwar dams by over 95% and depleting the meagre water storage.

The best way to know if the project is a boon or bane would be through an independent review of

the project. Such reviews happened at least twice, one set up by the World Bank, another by the Government of India. In both cases, the outcome was the same: the project in its current form should not go ahead. That answer was available about 25 years ago.

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RIGHT

The project is a lifeline for drought-prone areas of Gujarat and a must for national water security

S. Masood Husain

The Sardar Sarovar Project was taken up after the Narmada Water Disputes Tribunal gave its final award vis-à-vis Gujarat-Madhya Pradesh in 1979.

Benefits aplenty

The benefits from the project are immense. Nearly 18.45 lakh hectares of land are projected to be irrigated in Gujarat — a very large area by any standards. Besides, 2.46 lakh hectares in Rajasthan will be also irrigated. This will increase agricultural production to the tune of about 87 lakh tonnes per annum. Then, there is an installed hydropower capacity of 1,450 MW, which would be generating about 100 crore units of electricity per year. Drinking water will be provided to 9,500 villages, 173 towns of Gujarat and 124 villages of Rajasthan.

The project will provide flood protection to an area of about 30,000 hectares which is prone to the fury of floods. And about a million jobs will be created mostly in rural areas as a result of the project. Most of the areas covered are drought-prone and parched areas. A certain portion of the water will also be used for industrial purposes. In addition, there are benefits to the environment. The Shoolpaneshwar Wildlife Sanctuary area is going to increase from 150 square kilometres to 607 square kilometres.

Environment safeguards have been put in place. Trees are being planted. A total of 76.1 million tree saplings have been planted; for every tree submerged, 92 are being planted. About 4,650 hectares are marked for compulsory afforestation.

The list of benefits shows how the SSP is a lifeline for the drought-prone and parched areas of Gujarat. The project was being conceptualised since the early 1940s but the dam construction could not be planned properly for a long time as there was no agreement on the sharing of waters. After the Narmada tribunal was instituted in 1969, and with the award announced in 1979, the project was operationalised in full swing. And it is only after assessing all the alternatives that the project was considered. In my opinion, there was no other alternative.

After completion, the project will affect 230 villages in Gujarat, Maharashtra and Madhya Pradesh; of this, four will be completely submerged. The rest will be submerged only when the water reaches the full reservoir level. About 32,600 families would be affected on account of submergence. Relief and rehabilitation is being undertaken by the Narmada Control Authority. Its relief package is considered to be the best so far.

Intrinsic to water security

We have to keep in mind that the water security of the country depends on water storage. Our water storage is low when compared to Russia (per capita storage of 6,100 cubic metres), the U.S. (1,960 cubic metres), China (1,100 cubic metres); in India, it is only about 200 cubic metres.

Unless we have water storage, we cannot have water security. As per the National Commission report of 1999, we should have storage of about 450 billion cubic metres; we have so far only developed 253 billion cubic metres of storage — dams and reservoirs taken together. About 50 billion cubic metres of storage is under development.

Our food security and energy security are also dependent on water security. Lastly, inter-linking of rivers is essential to addressing the problem of floods and droughts in the country because water from the basins of water-surplus Brahmaputra, Ganga and Mahanadi rivers can be channelised to deficit areas. This would require storage, hence the case for large dams.

S. Masood Husain is member, water planning and projects, Central Water Commission and Director General, National Water Development Agency

As told to Anuradha Raman

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CENTRE

The distribution system needs to be reimaged to carry dam water to every home and field

Tushaar Shah

After 35 years in the works, 48,000 crore in capex, 45,000 ousted families, 245 submerged villages and 250,000 hectares of land acquired, for Gujarat, the Sardar Sarovar Dam project still remains just that, a promise.

Little gain so far

Gujarat's major attraction from the SSP was 11 billion cubic meters (BCM) of water to irrigate 1.8 million hectares of its parched land. Sadly, the SSP irrigates less than a quarter of this area, benefitting little more land than was acquired to construct it. Is this benefit worth the costs?

Not yet. Since 1990, Gujarat has gained more from 800 crore invested in constructing half a million check dams and desilting old tanks and reservoirs. According to Central Ground Water Board data, Gujarat is the only State that has improved its groundwater levels since 2000. Many give credit for this to the SSP. But waters from the SSP circulate on less than 3,00,000 hectares of Gujarat's 19.6-million-hectare landscape and cannot possibly have improved groundwater recharge all over the State. It is the check dams and desilted tanks all over the landscape that did the job. If Gujarat's agriculture grew at 9% every year since 2000, it was largely because of groundwater recharge.

Aquifers are omnipresent. Farmers access them through wells and tube wells. Increased storage in aquifers directly and immediately translates into benefits for the user. Not so with dams like the SSP. Their benefits depend on an effective distribution system. The SSP has been let down by the failure of its distribution system.

Back in the 1980s, SSP planners had proposed that beneficiary farmers would volunteer land and labour to build last-mile water courses to their fields. This was realistic in 1980 but not so today. Between then and now, Gujarat and its agriculture have morphed. Tube-well irrigation with subsidised electricity has emerged as the backbone of agriculture. Even in canal commands, farmers prefer tube-well irrigation-on-demand than waiting for occasional canal water release.

No wonder farmers have refused land for last-mile canal connectivity. Instead, farmers invested their own funds to install close to 1,00,000 pumps and millions of meters of over-ground and underground pipelines to lift SSP water and take it to their fields.

This surfeit of private pipelines was a godsend for SSP managers to innovate a farmer participatory regime for water distribution. Instead, Gujarat treated entrepreneurial pipeline irrigators as 'water thieves', unleashing police on them. It was only after a decade of failure in building water courses that Gujarat finally settled for underground piped distribution. But even then, instead of letting farmers do this in a regulated and planned manner, it gave the job to contractors unaware of the local dynamics. It is early days, but the results do not look promising.

Reimagining the project

The Sardar Sarovar Project needs to be reimagined in today's context. Gujarat's irrigation challenge is the annual 10,000 crore subsidy bill for farm power supply. Spreading SSP water on depleted aquifers can cut this bill down to a quarter, bolster the finances of distribution companies and cut power cost for the industry. Fluoride in groundwater that most Gujaratis use for drinking is a public health time bomb. Bringing SSP water to every home can defuse this.

With 11 BCM in live storage, Gujarat can ensure water for people and livestock for two successive droughts. But all these can happen only if it creates and masters a distribution system that carries dam water to every home and every field.

Tushaar Shah is a senior fellow at the International Water Management Institute

The new U.S. Fed Chairman is unlikely to opt for policies that might upset the President's plan

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NITI Aayog and IRF Geneva signs Statement of Intent (Sol) to cooperate in the field of Intelligent Transportation Systems (ITS)

NITI Aayog and IRF Geneva signs Statement of Intent (Sol) to cooperate in the field of Intelligent Transportation Systems (ITS)

The National Institution for Transforming India (NITI Aayog) and the International Road Federation, Geneva (IRF Geneva) have, today, signed a Statement of Intent (Sol) to cooperate in the field of Intelligent Transportation Systems (ITS).

The objective of the Sol is to create a national platform, involving all relevant Government of India stakeholders, Indian and foreign companies active in the sector, and relevant technical experts for the purpose of developing a National ITS Policy covering:

- 1) Traffic Management,
- 2) Parking Management,
- 3) Electronic Enforcement of Traffic Rules and Regulations,
- 4) Fleet Management and Monitoring,
- 5) Innovation in the field of ITS, and
- 6) Education in the field of ITS.

The objectives of this national ITS Policy will be to contribute to reducing urban traffic congestion, improving the situation around parking of vehicles in cities, improving road safety, and improving the security of passenger and goods traffic. The work of this National Platform will provide a coherent and consistent National ITS Policy covering domains such as traffic and parking management, enforcement, and security.

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Smarts cities acquiring censor based 'eyes' and 'ears' connected to Command and Control Centres

Smarts cities acquiring censor based 'eyes' and 'ears' connected to Command and Control Centres

Digital Integrated CCCs act as 'brain' of cities for coordinating civic services

Installation of CCCs in progress in 11 smart cities and bidding completed in another 23

Centre organizes workshop on sharing experiences among cities in Mumbai

Smart cities in the making are set to rise to an entirely a new level of monitoring and delivery of civic services through digitally integrated Central Command and Control Centres, said Shri Durga Shanker Mishra, Secretary (Housing & Urban Affairs), Government of India today. He said so while inaugurating a day long 'Learning and Experience Sharing Workshop on Digitally Integrated Command and Control Centres under Smart City Mission' in Mumbai.

Shri Mishra further said that these centres would serve as the 'brain centres' of smart cities for ensuring effective coordination in the functioning of various agencies of urban local bodies resulting in improved monitoring and delivery of services to citizens. He said that with these centres based on a host of sensors connected to a central server function as the 'eyes' and 'ears' of cities as well by enabling monitoring of garbage collection and it's transportation truck-wise, filling and emptying of garbage collection bins, traffic and red light violation, noise pollution etc.

Shri Mishra urged the cities that are setting up such centres under Smart City Mission to ensure their timely completion so that citizens could benefit from them at the earliest.

Dr.Samir Sharma, National Mission Director, Smart City Mission said that different IT based projects taken up by cities in recent years have been operating in isolation and CCCs seek to integrate all such systems with several enhanced features for better integration for better information and service delivery.

Dr.Sharma informed that Command and Control Centres are under implementation in 11 cities viz., Pune, Nagpur, Ahmedabad, Surat, Vadodara, Jaipur, Raipur, Naya Raipur, Bhubaneswar, Visakhapatnam and Kakinada (Andhra Pradesh). These centres have already become partly operational in Pune and Nagpur. 23 other cities have completed bidding process for setting up such centres.

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In Gujarat, after Narmada dam, focus on canals

On September 17, Prime Minister Narendra Modi announced the completion of Gujarat's lifeline, the Narmada dam project, the foundation of which was laid by the first Prime Minister, Jawaharlal Nehru, in 1961.

Why did it take so long?

The Sardar Sarovar dam, built over the Narmada river in south Gujarat, is the second biggest concrete gravity dam by volume after the Grand Coulee Dam in the U.S. It faced many hurdles, including the World Bank's refusal to fund it on grounds of environmental damage and displacement of tribals in Madhya Pradesh, Maharashtra and Gujarat. Mr. Modi criticised those who tried to stop the project and said that despite all obstructions and massive challenges, the people of Gujarat were determined to complete the project. The cost, originally pegged at Rs. 6,000 crore, has increased several times over and is now estimated to be around Rs. 50,000 crore.

When will the network be built?

The project was originally planned to deliver water to the parched Saurashtra, Kutch and north Gujarat regions and also parts of neighbouring Rajasthan. The question being asked by farmers, the real beneficiaries of the project, is when will the canals to bring the water all the way from south Gujarat to the parched fields in Surendranagar, Rajkot or Banaskantha be completed.

Though the dam has been built with full height permitted by the Supreme Court, all gates have been closed as the canal network is not in place to take water from the dam to the fields in the project command area.

As per the Gujarat government's figures, the Sardar Sarovar Project will provide irrigation facilities to 18.45 lakh hectares, covering 3,112 villages of 73 taluks in 15 districts of Gujarat, 2.46 lakh hectares in Barmer and Jalore in Rajasthan and 3,75,00 hectares in Maharashtra. The project's canal network involves a 532 km main canal and 32 branch canals and minor, sub-minor canals and finally field channels. Though the main canal was completed a decade ago, the State authorities have not been able to build minors, sub-minors and field channels to realise the full benefits of the project. "Under the original plan, about 90,389 km of canal network was proposed to be built to irrigate 1.8 million hectares in Gujarat. However, there is no clarity on how much network has been built so far and the area it has brought under irrigation," says the former BJP Chief Minister Suresh Mehta.

He said that instead of building the canal network according to the original plan, the State government had, in fact, reduced the command area and the canal network without obtaining permission from the authorities. According to him, the State brought down the canal network size from 90,389 km to 71,748 km, which means a reduction of 18,641 km.

Academic Vidhyut Jodhi, who has written two books on the project, said that not more than three lakh hectares was under irrigation by Narmada waters because the government, having completed the main canal and branch canals, had not built field channels to take the water to the last mile.

Owing to absence of minor, sub-minor and field channels, farmers along the branch canals have put up diesel engines to draw water to irrigate their farms which are near the main canal network.

What is the way ahead?

Having built the dam, the State must strive to make it a participatory project which means handing over the water management to local water users' associations in villages. So far, the government has only registered such associations on paper. Farmers will need to be educated on crop patterns to boost production.

Mahesh Langa

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Why Indian cities are dirty

We are all familiar with the call for cleanliness that is regularly conveyed to the public through different forms of media. Photo ops of "netas" wielding brooms on streets, with the dust and the garbage of the city being swept off roads, are shown often on [Facebook](#), Twitter and other online platforms. After several months of this great countrywide "abhiyan" however, our nation remains the dirtiest country in the world.

There is no such campaign in any other country in the world, yet they are far cleaner than villages and cities in India. In my travels, I have yet to come across any place that is as dirty and as full of litter as an Indian town. Every time I return to India this is a fact that strikes me the most - that I am back in the dirtiest country in the world. Yet, I have never come across the sight of streets being swept as energetically in any other city abroad, never seen dignitaries handling brooms as assiduously as I have done here.

So what is the secret behind the mystery of the cleaner cities? As an author of several mystery adventure novels for children this is one mystery I know I can solve. Yes, it is simple, my dear Watson. No, it is not because litter is removed quietly and secretly on dark nights when the whole world sleeps, nor is it because the rubbish is made to vanish magically by helpful wizards, nor do aliens carry the garbage to research on what constitutes the filth found on the streets of planet earth.

It is the discipline instilled in the minds of citizens from an early age that helps maintain cleanliness in a country. "Do not litter" signs may be there in many public places in India and children in our schools may be told to throw waste into dustbins, yet this has not become the clarion call of our leaders. They may conduct all kinds of campaigns - against cow slaughter, against people of other religions, and so on - but so far the most important campaign against "dirtying" has not been taken up by anyone. Our public spaces are allowed to get as dirty as possible. And no wonder, for some sweeper or cleaner is bound to come and clear the rubbish. That is his job. After all, he must be getting paid to do the work. So we have every right to throw plastic bottles, bits of paper and whatever we do not need, anywhere and everywhere. Drains along roads are public dustbins and that is where we deposit our waste, no matter if the drain gets blocked or choked and the dirty water overflows on to our doorsteps. We have every right to sweep our shops and throw the dirty stuff into the drain running alongside the road leading to our home. After all, homes where puja is performed must be kept pure and clean, no matter if the brooms direct the dust and other impure matter straight onto the street in front of our pure homes.

"Gandagi nahi failayenge!" "No dumping of litter!" This slogan should ring from east to west and from north to south. "Kachra idhar udhar nahi daalenge!" should be the slogan, and not the one being made popular today. This is the secret behind the clean public places seen in other cities in other countries. It is not the "cleaning", but the "not dirtying" habit that needs to be encouraged in our citizens.

During our stay in Germany almost 50 years ago, it was a crime to throw anything outside our home in Bonn. Two dustbins were placed before our front door; all waste was placed there and they were cleaned regularly every week by the municipality. During winter, one had to remove the snow from the pavement outside our home so that passersby would not be inconvenienced. It was our responsibility to keep the area in front of our home spotless all the time. A friend of ours in the US, also many years ago, was pursued by an irate motorist, because he had thrown the remains of an [apple](#) he had been eating on the road. He was forced to pick up the apple and deposit it in a dustbin rather than on the road. We know China ended its citizens' habit of spitting on streets a long time ago.

The focus in the Swachh Bharat Abhiyaan, in short, should not be on the cleaning up of an already dirty space but on the prevention of any public spot from becoming dirty. There should be strict rules on using dustbins, which must be installed everywhere and regularly emptied by municipal authorities, with a proper system in place for doing so. The rule that everyone should keep public spaces around their homes, shops or other establishments clean and free of litter will automatically lead to cleaner cities and healthier and happier citizens.

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From waste to health

Keeping cities clean is essential for keeping their residents healthy. Our health depends not just on personal hygiene and nutrition, but critically also on how clean we keep our cities and their surroundings. The proliferation of dengue and chikungunya are intimately linked to the deteriorating state of public health conditions in our cities.

The good news is that waste management to keep cities clean is now getting attention through Swachh Bharat Mission. However, much of the attention begins and stops with the brooms and the dustbins, extending at most to the collection and transportation of the mixed waste to some distant or not so distant place, preferably out of sight.

The challenge of processing and treating the different streams of solid waste, and safe disposal of the residuals in scientific landfills, has received much less attention in municipal solid waste management than is warranted from a health perspective. If we do not rise to the occasion to manage the waste that we generate and fail to create clean and healthy cities, we will face many more man-made disasters such as we have seen in recent months in Deonar, Bellandur, and Ghazipur.

One of the problems is that instead of focusing on waste management for health, we have got sidetracked into "waste for energy". In the process, we are opting for financially and environmentally expensive solutions such as incineration plants which are highly capital-intensive. While the National Green Tribunal (NGT) does not allow incineration of mixed waste, nor of any compostables or recyclables, enforcement is a challenge, and the danger to health from toxic emissions looms large.

If only we were to begin by not mixing the biodegradable component of solid waste (close to 60 per cent of the total) in our cities with the dry waste, and use this stream of waste for composting and biomethanation, the management of dry waste would also be made much easier through recycling and processing including by incineration of non-recyclables with appropriate filters to check emissions; scientific landfills will be needed for the little that remains.

City compost from biodegradable waste provides an alternative to farmyard manure (like cowdung) which has been valued from time immemorial for its rich microbial content that helps plants to take up soil nutrients. It provides an opportunity to simultaneously clean up our cities and help improve agricultural productivity and quality of the soil.

India's Green Revolution rescued us from huge dependence on food imports during droughts by using high-yielding varieties of seeds and chemical fertilisers to boost the productivity of food grains. But over time, excessive and imbalanced use of chemical fertilisers has led to severe deterioration in the quality of soil. Organic manure or compost plays a very important role as a supplement to chemical fertilisers in replenishing the nutrient-depleted soils. City compost can be the new player in the field.

Benefits of compost on the farm are well-known. The water holding capacity of the soil which uses compost helps with drought-proofing, and the requirement of less water per crop is a welcome feature for a water-stressed future. Because of good water retention, farmers do not need second or third sowing if rains fail. By making soil porous, use of compost also makes roots stronger and resistant to pests and decay. Farmers using compost therefore need less quantity of pesticides. There is also evidence to suggest that horticulture crops grown with compost have better flavour, size, colour and shelf-life.

City compost has the additional advantage of being weed-free unlike farmyard manure which brings with it the seeds of undigested grasses and requires a substantial additional labour cost for weeding as the crops grow. City compost is also rich in organic carbon, and our soils are short in this. Fortification of soil with organic carbon is an essential element of integrated plant nutrient management as it increases the productivity of other fertilisers. City compost can also be blended with rock phosphate to produce phosphate-rich organic manure.

Chemical fertilisers when used by themselves pollute surface water with nitrogen runoff because only 20 per cent to 50 per cent of the nitrogen in urea is absorbed by plants. The rest runs off into streams and lakes. The addition of compost or organic manure reduces nitrogen wastage, as its humus absorbs the nitrogen and acts like a slow release sponge. The superiority of a system of integrated plant nutrient supply (IPNS), which combines the use of chemical fertilisers with organic manure, was established as far back as 1989 by the Fertiliser Association of India.

Farmers clearly recognise the value of city compost. In most cities, waste transport drivers are bribed by farmers to dump reasonably biodegradable raw garbage onto their fields for making compost onsite for their own farm use. But uncovered and uncomposted raw waste heaps breed rats and insects which carry disease, and attract stray dogs which not only carry rabies but form hunting packs that kill nearby livestock at night. They are also notorious for dog bites and causing traffic accidents by day.

If city waste was composted before making it available to the farmers for applying to the soil, cities would be cleaned up and the fields around them would be much more productive. It would, however, require that delivery mechanisms be set up for the delivery of city compost to farmers.

Recognising the importance of organic manure for the balanced nutrition of crops and restoring soil health, the Supreme Court had directed fertiliser companies in 2006 to co-market compost with chemical fertilisers. However, this direction went largely unheeded. The Solid Waste Management Rules 2016 make the co-marketing of compost mandatory. To provide incentive for co-marketing to the fertiliser companies, in February 2016, the Government of India's Department of Fertilisers notified a policy to promote the use of city compost by offering Market Development Assistance (MDA) of Rs 1,500 per tonne on the purchase and distribution of city compost through the rural outlets of these companies. In 2017, the MDA scheme was extended to compost manufacturers on bagged compost.

The MDA scheme has not worked well because of its administrative complexity and it needs to be simplified. The high volume but low value nature of compost also makes it not so attractive for fertiliser marketing companies to promote its use. While compost manufacturers must meet the quality specifications laid down by the Fertiliser Control Order (FCO), it is equally important for fertiliser companies to make vigorous efforts to market city compost using their well-connected dealer channels and help develop this nascent sector.

It could well be that the companies would rather sell chemical fertiliser which is heavily subsidised. A possible solution in such a situation would be to find a way to make the payment of fertiliser subsidy to the fertiliser companies conditional on the co-marketing of compost. The state agricultural departments can also help facilitate the use of city compost through their widespread extension networks.

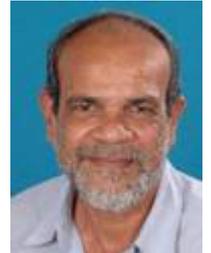
Assuming that urban India generates 70 million tonnes of municipal solid waste in a year, and assuming 15 per cent yield of compost, this would provide 10 million tonnes of city compost annually. Quite apart from cleaning up the cities of biodegradable waste, this would be a major and sustainable contribution to improving the health of our soil without further damage by excessive chemical inputs. What a marvelous transition from waste to health.

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Special Feature – 27th September (World Tourism Day)***World Tourism Day- International Year of Sustainable Tourism 2017*****Chartering roadmap towards sustainable Tourism*****Pandurang Hegde**

The arrival of foreign tourists into the country has increased from 6.8 per cent in 2016 to 16.5 per cent in January 2017. Similarly the domestic tourist arrivals in 2017 increased to the massive 15.5 per cent over 2015. Obviously, these rising tourist arrivals of both domestic and foreign tourist indicate the success of the tourism policies implemented by NDA government since 2014.

The major factor for increase in arrival of foreign tourist is the policy of introduction of online visa facility that has been extended to more than 180 countries. The reforms of extending e-visa facility for medical and business travelers, and increasing the time period of stay from 30 to 60 days has attracted foreign tourists who are keen to visit India.

The launching of e-ticketing of historical monuments like Taj Mahal, introduction of dedicated tourist trains across India and 24x7 tourist help line has had positive impact on the arrivals of tourists from foreign countries.

In the period from 2015 to 2017 the foreign exchange earnings from tourism has shown an increase of 13 per cent from 12000 crores to Rs 13669 crores.

Tourism sector has enormous potential to grow and contribute towards the higher GDP. It provides employment to 39.5 million people working in hospitality industry. Realizing this potential, the Finance Minister Sh. Arun Jaitely in his Budget speech of the year 2017-18, proposed to set-up Five Special Tourism Zone, anchored on SPVs in partnership with the States. The Finance Minister underlined the fact that Tourism is a big employment generator and has a multiplier impact on the economy. The Minister also announced the launching of Incredible India 2.0 campaign across the world during the year.

The Prime Minister has also made earnest attempt to broadcast the diversity of India through social media and showcasing them to the world. He has also spoken about the cultural diversity and spiritual affinity to tap the potential of country's spiritual legacy. The Prime Minister has approved liberalizing of this sector permitting 100 per cent Foreign Direct Investment in hospitality industry to create basic infrastructure across the country.

Travel and tourism is one of the key sectors that receive special support from the Central Government. The government of India launched several schemes to attract tourists. The Swacch Bharat Abhiyan is the fulcrum under which the tourist destinations are kept clean, like renovation of river ghats in pilgrim cities like Varanasi. The slogan of "Swaachh Bharat Swaachh Smarak" given by the Prime Minister indicates the need to keep the heritage sites clean.

Adarsh Smaarak in an innovative scheme launched by Archaeological Survey of India to promote basic tourist facilities in well-known historical sites.

Swadesh Darshan is an important scheme of the Ministry of Tourism. The scheme is based on the vision to develop theme-based tourist circuits on the principles of high tourist value, competitiveness and sustainability by synergizing efforts to focus on needs and concerns of all stakeholders. Under the scheme, 13 thematic circuits have been identified across the country for development.

Under PRASAD Scheme, 25 sites of religious significance have been identified for development in India namely Amravati (Andhra Pradesh), Amritsar (Punjab), Ajmer (Rajasthan), Ayodhya (Uttar Pradesh), Badrinath (Uttarakhand), Dwarka (Gujarat), Deogarh (Jharkhand), Belur (West Bengal), Gaya (Bihar), Guruvayoor (Kerala), Hazratbal (Jammu & Kashmir), Kamakhya (Assam), Kanchipuram (Tamil Nadu), Katra (Jammu & Kashmir), Kedarnath (Uttarakhand), Mathura (Uttar Pradesh), Patna (Bihar), Puri (Odisha), Srisailem (Andhra Pradesh), Somnath (Gujarat), Tirupati (Andhra Pradesh), Trimbakeshwar (Maharashtra), Omkareshwar (Madhya Pradesh), Varanasi (Uttar Pradesh) and Vellankani (Tamil Nadu).

Sustainable Tourism – a tool for Development

Tourism is the third largest export industry in the world, with 1.235 million travelers crossing international borders. The United Nations General Assembly has declared 2017 as the International Year of Sustainable Tourism. It has called for an approach to tourism based on inclusive economic growth, bringing decent jobs to local communities, preservation of environment, addressing climate change and respecting the unique cultural identity of the people.

Thus, tourism development provides unique opportunity to promote better future for people, planet and prosperity. The motto of the 2017 World Tourism Day is the respect nature, culture and respects the host.

The Government is in the process of formulating a new National Tourism Policy (NTP). The salient features of NTP are developing tourism in sustainable and responsible manner, employment generation and community participation.

It aims at promotion of diverse tourism opportunities including showcasing of rich culture and heritage of the country and the niche products as Medical and Wellness tourism. It also emphasizes on skill development and enabling environment for investment in tourism related infrastructure. It also aims at promoting domestic and foreign tourist destinations to experience the diversity of the country.

The Ministry of Tourism has adopted code of conduct for safe tourism, containing safe guidelines for both tourists and local residents that assure basic human rights, freedom from exploitation of women and children.

There are some bottlenecks in implementing the sustainable tourism goals due to the lack of basic infrastructure like roads and providing clean, comfortable accommodation to tourists. In order to address these issues the government is upgrading passenger terminals, improving connectivity to tourist destinations, providing safe drinking water and establishing communication networks in tourist areas to facilitate tourists.

India with her cultural, spiritual and natural richness offers unique experience unparalleled by any other country in the world. Diverse traditions, life styles, colorful fairs and festivals offer a vast variety of choice for the domestic and foreign tourists.

Indian government is not only aware of how to use the tourism sector as a tool to achieve sustainable development goals, but it is committed to bring and share the benefit of travel and tourism equitably with the local communities. The forests, tribal lifestyles, beautiful coastline and beaches, wild life sanctuaries and national parks provides rare opportunity to the visitors, compelling them to revisit the country to experience this diversity.

The Minister of State (IC) for Tourism K. J. Alphons has said “We must spread the word about India’s heritage, philosophy, and it’s incredibly diverse cultures which are worth experiencing.”

The enabling environment being created by the Government of India towards making the country tourist friendly is definitely charting a roadmap towards attaining sustainable tourism, the major goal of International Year of Sustainable Tourism.

**The author is an independent journalist and columnist based in Karnataka.*

Views expressed in the article are author’s personal.

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**Linkage of rivers will help farmers to grow more crops and contribute in progress of the country:
Vice President**

Linkage of rivers will help farmers to grow more crops and contribute in progress of the country: Vice President

Unveils Plaque for 'Sujalam Sufalam Yojana'

The Vice President of India, Shri M. Venkaiah Naidu has said that linkage of rivers will help the farmers of our country to grow more crops and raise their earnings and contribute in the progress of the country as a result of increased irrigation facilities. He was addressing the gathering after unveiling the Plaque for the 'Sujalam Sufalam Yojana' (Water and Irrigation Projects), in Mehsana, Gujarat, today. The Governor of Gujarat, Shri Om Prakash Kohli, the Deputy Chief Minister of Gujarat, Shri Nitin Patel, former Chief Minister of Gujarat, Smt. Anandi Ben Patel, the Minister of Water Resources, Government of Gujarat, Shri Nanubhai Vanani and other dignitaries were present on the occasion.

The Vice President said that there are many rivers in our country, and some of the states are receiving more water and in many other states, farmers are not getting benefits of these rivers. He further said that the Governments have been considering over inter-linking of rivers for decades. But there were many hurdles in its realization and so it took time to implement this concept, he added.

The Vice President expressed his happiness that Gujarat Government has given concrete shape to the concept of river linkage and has linked Narmada and Sabarmati rivers, so that more and more farmers are benefitted. He further said that he is fortunate to inaugurate the Plaque for the Project.

The Vice President said that the main sources of the progress of Gujarat are: Agriculture and Industry and every state must pay due attention to both of them. Work for everyone and water for every farm is very important and this was a beautiful dream of Pandit Deen Dayal Upadhyay, he added.

The Vice President said that there are many public-welfare programmes, specially irrigation programme already going on in Gujarat. He further said that by making small dams, this state has shown how to preserve rain-water that reaches the farms. Despite facing many hurdles, this state has built Sardar Sarovar Dam, which is one of the world's highest dam, he added.

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The danger in Asia's demographics

Last week's move by Standard & Poor's (S&P) to downgrade China, the first time since 1999, didn't have the same shock value as its 2011 call to strip "AAA" status from the US. But it's a timely reminder of the biggest problem facing Beijing and much of Asia.

No, not the soaring debt that S&P's cited, as did Moody's when it downgraded Beijing in May. The real reason S&P's cut China's sovereign rating to "A+" from "AA-" is demographics. Yes, China has immense savings. As it churns out tens of trillions of dollars of fresh credit, though, a dwindling workforce, lost productivity and deflation could strain the central government's ability to balance servicing exploding debt with financing its social development. And China is hardly alone. Hong Kong, Japan, Singapore, South Korea and Taiwan also face demographic headwinds.

It's understandable that those riding demographic tailwinds might feel smug. But officials in India, Indonesia and the Philippines must consider their own population-growth-related vulnerabilities. So must investors.

Warnings of China's demographic reckoning come just as Deloitte LLP delights governments in Jakarta, Manila and New Delhi enjoying young and growing labour pools. India came out on top. In Asia, generally, the ranks of those over 65 will rise from 365 million now to more than half-a-billion in 2027, Deloitte said.

By 2030, Asia will have 60% of the global share. Young India, by sharp contrast, will drive the next Asian tailwind as its potential workforce surges to 1.08 billion people from 885 million over the next 20 years. Equally important, it will hold around there for roughly 50 years. Indonesia and the Philippines also are looking at decades of swelling-workforce magic.

Or not. If Narendra Modi, Joko Widodo and Rodrigo Duterte aren't losing sleep over these trajectories, they're delusional. Demographic dividends only matter if Modi can create future jobs for the roughly 25% of his 1.3 billion people under the age of 15. So far, that hasn't been the case. For all the excitement about Modi's 'Make in India' push, job creation in export-related industries isn't anywhere near what New Delhi advertised. Nor is domestic retail-sector growth picking up the slack with well-paying new positions. It's hard to be too optimistic about the consumption outlook.

That's especially so now that Modi appears to be resting on his laurels. After steps to open the aviation, insurance and defence industries, all indications are that the Bharatiya Janata Party is already focused on the 2019 election. Unfortunately, the real big bang will only come when Modi revolutionizes labour, land and tax policies and goes markedly further to cut red tape and increase government efficiency.

That goes, too, for Indonesia's Widodo, who's known as Jokowi, and Philippine President Duterte. Jokowi is indeed working to improve infrastructure, reduce graft, increase transparency and, via tax tweaks, facilitate the return of billions of dollars of investment into South-East Asia's biggest economy. Yet it's not enough. Neither Indonesia's urbanization boom nor its enviable store of national resources nor its growing middle class will matter if Jokowi doesn't hasten reforms.

Efforts to improve roads, bridges, ports and power grids, rein in the bureaucracy and ensure legal contracts are enforced are lagging today's 5% growth, argues Elizabeth Pisani, author of *Indonesia Etc: Exploring the Improbable Nation*. For all Jokowi's efforts to decentralize democracy and take on what she terms the "judicial mafia", a menace that complicates doing business, Indonesia will have a hard time climbing the global competitiveness rankings, Pisani says.

The Philippines may be an even bigger risk. Duterte's economy is experiencing China-like growth of 6.5%, but his policy priorities are more about guns than butter. His bloody drug war has already filled more body bags (at least 7,000) in 456 days than brutal dictator Ferdinand Marcos did in 20 years. Policing drug pushers and users is important, but it's eclipsed all else—including economic upgrades.

The mandate voters gave Duterte, remember, was to accelerate the reform successes of predecessor Benigno Aquino. From 2010 to 2016, Aquino strengthened the national balance sheet, increased transparency and accountability, went after tax cheats and ignored the powerful Catholic Church to cap a population growing faster than incomes. Voters turned to strongman Duterte to take things to new levels. Sadly, his priority is deputizing bands of gunmen to shoot alleged drug-trade members extrajudicially. Not surprisingly, the peso is Asia's worst performing currency so far this year.

The US Federal Reserve's rate hike campaign won't help efforts in Jakarta, Manila and New Delhi to maintain growth consistent with rising living standards. But it's crucial that Jokowi, Duterte and Modi hit the reform accelerator to create enough decent jobs to employ their swelling populations. That means spreading the benefits of rapid growth, investing more in human capital and attracting ample foreign investment.

If not, China's challenges may pale in comparison to hundreds of millions of young Filipinos, Indians and Indonesians turning on governments running afoul of demographic trajectories.

William Pesek, based in Tokyo, is a former columnist for Barron's and Bloomberg and author of Japanization: What the World Can Learn from Japan's Lost Decades.

His Twitter handle is @williampesek

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NHAI's projects to generate approximately 50 Crore man-days employment over next four years

The ongoing and targeted projects of National Highways Authority of India would generate estimated employment of approximately 50 crores man days over the next four years on a seasonal basis. This would be averaging to nearly 12.5 crore man-days yearly from 2018-2022. Of this, about 1.0 crore will be professional man-days, 3.5 crore skilled labour man-days and 8.0 crore semi-skilled and un-skilled man days.

The NHAI currently has 282 projects having length of about 20,000 km under implementation across the country out of which 10,000 km of length is targeted to be completed over next one to two years. There are around 220 projects having length of about 31,000 km which are targeted to be awarded and completed in the next 3 to 4 years across all the States in the country under NHDP and Bharat Mala Schemes. Thus, NHAI plans to construct approximately 50,000 km Highways in next 4 years.

This will generate seasonal employment opportunities as successful and efficient execution of projects invariably requires qualified professionals, skilled and semi-skilled work force.

In order to meet the requirement of professionals, skilled and semi-skilled work force, NHAI has undertaken an elaborate exercise for Skill Development. The Chairman, NHAI Shri Deepak Kumar, held a meeting with the officers of Ministry of Skill Development and Entrepreneurship to chalk out the road map for skilling of professionals, skilled and semi-skilled workers. Various issues connected with the Skill Development were discussed in the meeting. The Chairman, NHAI asked the officers of Ministry of Skill Development and Entrepreneurship to submit detailed plan of Skill Development in tune with the requirement of NHAI projects. The plan would be finalized in discussion with the concerned stakeholders.

NP/MS

END

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