

JUNE 1-15, 2014

Down To Earth

SCIENCE AND ENVIRONMENT FORTNIGHTLY

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ENVIRONMENT
DAY SPECIAL**

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SUSTAINABLE URBAN WATER MANAGEMENT

RAINWATER HARVESTING AND DECENTRALISED WASTEWATER TREATMENT

JUNE 30 - JULY 4, 2014

The increase in urbanisation has led to increase in the fresh water demand along with wastewater generation. The current water crisis is attributed to mismanagement of water resources and emphasis on the energy as well as resource intensive centralized urban water management. Need is, for the practitioners and user communities, to implement sustainable and affordable decentralised water management practices. This short term five day course will focus on — designing rainwater harvesting (RWH) and decentralised wastewater treatment systems (DWWT) including local reuse. Registration to this popular course is on first come first basis.

PROGRAM DESIGN

The two training programmes will include lectures, interactive sessions with leading experts/practitioners, presentation on case studies, do it yourself - group exercises and one day field visit to successfully implemented RWH and DWWT systems in and around Delhi with an opportunity to interact with real implementers and users.

Urban Rainwater Harvesting

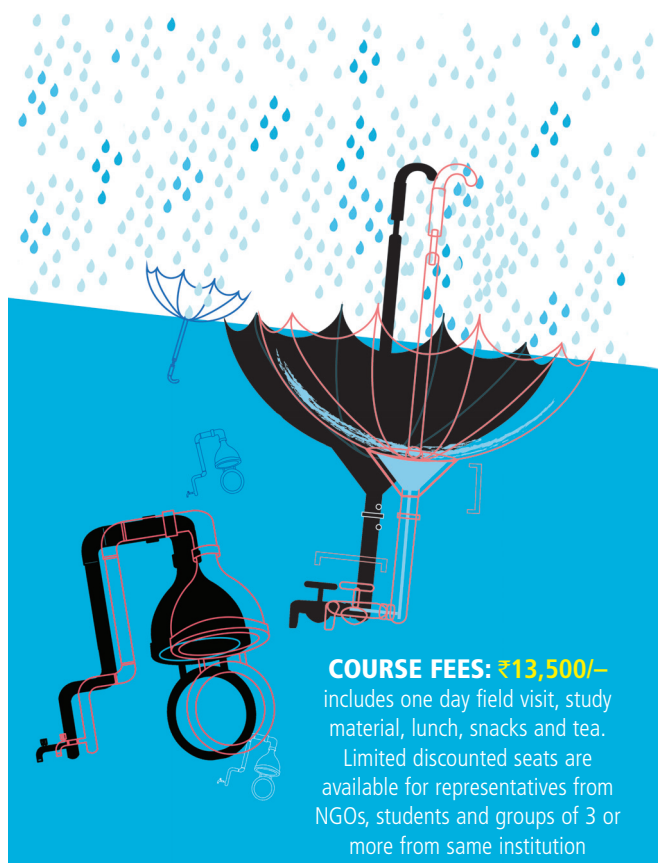
Two day programme will focus on understanding the potential of water augmentation at building and/or neighbourhood scale. The training will impart skills on planning and designing both recharge and storage structures, techno-economic feasibility, operation and maintenance etc.

Decentralised Wastewater Treatment

Two day programme will focus on understanding potential of sustainable and affordable decentralised wastewater treatment (DWWT) systems for local reuse. The training will provide hands on experience in planning, designing, techno-economic feasibility, operation and maintenance of DWWTs etc.

WHO CAN APPLY?

Practitioners (engineers / architects / planners / representatives of non-governmental organization and government officials), academicians, consultants, students, researchers.



COURSE FEES: ₹13,500/-

includes one day field visit, study material, lunch, snacks and tea. Limited discounted seats are available for representatives from NGOs, students and groups of 3 or more from same institution

HOW TO APPLY?

E-mail your curriculum vitae to water@cseindia.org before June 15, 2014. Limited seats; registration will be done on first come first basis.

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38, Tughlakabad Institutional Area, New Delhi

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Email: chhavi@cseindia.org / water@cseindia.org

TO ALL OUR READERS

YOU WILL NOTICE in this issue some big and small changes. This is our 530th issue, which means we have been researching, writing, designing and publishing *Down To Earth* for 22 years. Every fortnight our aim is to bring you news, perspectives and knowledge that can help you make a difference. Our objective is to prepare you to change the world. We believe information is a powerful driver for the new tomorrow.

So after producing 529 issues and just at the time when India is taking a new breath, we revised the magazine for your reading. In this age of fast news and Internet-driven information, we believe there is a hunger for in-depth analysis and perspectives. We know you want to know much more about the little things you skim over in newspapers. There is a story behind and a way ahead. So, we have reworked *Down To Earth* to do this.

Then we also know you crave for new ideas; you want to know what is changing in our world that is for the good. We all have a duty to hope. We have, therefore, introduced sections that look into the ways people are working in forests, farms and factories to make a difference.

We will also try and tease out how these small experiments in our world's development laboratory can be scaled up. In our experience scaling up invariably requires a change in some policy, rule or regulation. Our objective is to provide this understanding for impact.

Most importantly, we believe there is a lot more that's missing in the news. When we started *Down To Earth* in 1992, we had no competitors. There was nobody who provided information about environmental change. We filled the huge information gap. Today in 2014, environment has become a mainstream topic. All newspapers write about it; this is good news. We want competitors. We want the information about the issues that matter to be on the front pages of newspapers and television screens, day after day. But in 2014, we know we still fill a gap. There is news

about environment, but it does not build our perspective; it does not go beyond the ordinary and the known; it does not venture into remote villages and does not look into the lives and knowledge of the people who are missing from our view. Even as there is more news, there is less news about what is happening outside cities; more and more people are today out of sight and out of our mind. We aim at fixing this.

Moreover, our daily news barely covers the world of science as it interfaces with modern society. *Down To Earth* will feature history and archaeology to bring you perspectives of how the past still influences our present; meteorology and climate change sciences will inform you about our changing weather. And our sections on green architecture, changing lifestyles and culture of food will give you information that you can use.

We also have to ask for your help. In every issue we produce, we aspire to bring you accurate, rigorous and useful information that will drive change in our world. We know we make a difference. We know this because our articles are used to push policy; used to challenge status quo; used to spread the word about what is possible. We know you believe in our independence. We have your trust. Our information has purpose. It is credible.

We promise to keep this trust. But we need something from you as well. We need your involvement in taking our ideas further. We do not have the marketing muscle to get into each house; we are also limited by language. But we know if you can be our messenger, multiplier and our friend, you can spread the word, use our information, take the word to action, bring us back the news about this impact. Help us to do what seems so impossible: turn the tide so that our present and future are secure.

Let me know what you think of the new look of *Down To Earth*. I look forward to our continued journey together. ■




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ON THE WEB



WHAT'S HOT



One victory, many failures

Down To Earth analyses why corruption, models of development, rights-based legislation and local environmental and health concerns mattered little in the 2014 elections. We also invited people to write to us what they think should be the development agenda for the new government

SPECIAL FEATURE

Forest fires getting more frequent. Is climate change the reason?



While India has already witnessed seven to eight major forest fires this year, countries around the world are either busy fighting similar fires or have sounded alerts for them. Most forest fires in India this year were in

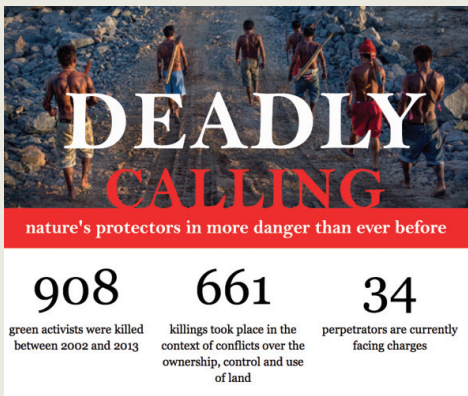
and around national parks and sanctuaries. Among the forest fire incidents that occurred outside protected areas, the major one was in the first week of February on Mount Japfu, Nagaland's second highest peak

BLOG

It's time Indian policymakers had a nuanced understanding of forest fires, says Tarsh Thekaekara, NGO professional

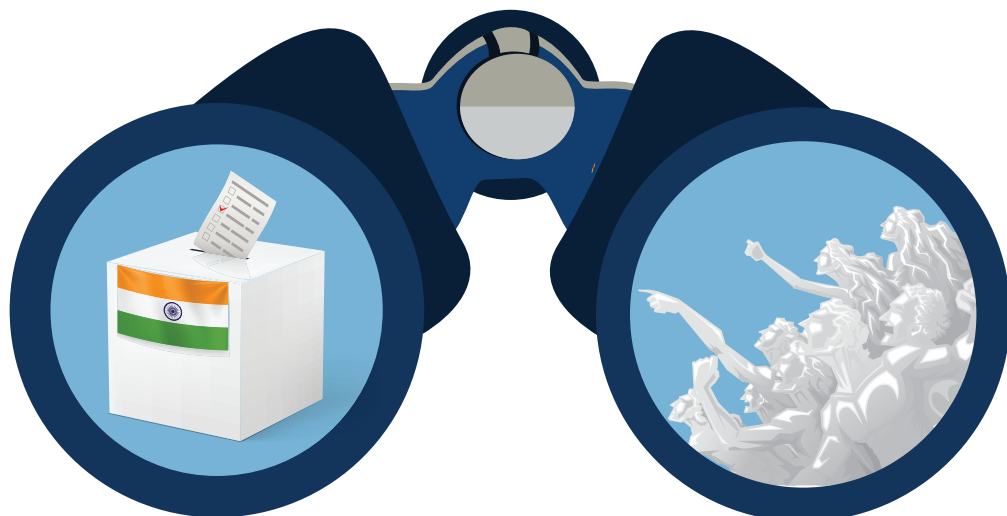
Adding another national regulator will not help environment. India needs second-generation reforms in environmental governance, says Chandra Bhusan

INFOGRAPHIC



Nature's protectors in more danger than ever before

Ramesh Agrawal, Indian environment activist who was recently awarded the Goldman Prize, survived an attack by gunmen in 2012 in Chhattisgarh. Others of his ilk have not been so lucky



AJIT BAJAJ / CSE

All is not well in Modi's Gujarat

This is with reference to the editorial, "Gujarat v UPA: models of non-governance?" (May 1-15, 2014). The development in Gujarat portrayed by Narendra Modi is mostly confined to industrialisation. Every time I read about the Gujarat model of development, I only get to read about the economic growth. But a state's success cannot be measured only by economic parameters. What about social indicators such as standard of living, employment, nutrition, education and welfare? Last year, Unicef revealed some startling figures on child malnutrition and sex ratio in the state which show that development has not kept pace with economic growth. While criticising UPA's model of development and comparing it with Gujarat's, critics would do well to realise that Modi's state, too, has not done exceptionally well on the social front.

A JAGADEESH

Slum cause

"Whose flat is it anyway" (April 16-30, 2014) talks about the government's failure to deal with the ever-expanding *jhuggi jhopdi* clusters and the flawed criteria of flat allotment to slum dwellers in Delhi. Although these are valid points, the issue requires a more critical approach. Every year, thousands of people from villages, mostly labourers, migrate to the city in search of job. In the absence of adequate wages and property, many end up in slums. The government,



SHAHANA SHEKH

while rehabilitating existing slum dwellers in the city, should check the exodus of people from rural areas. For this, it needs to create more work opportunities in

villages. Rural development should be such that the village youth do not feel the need to migrate to the city for livelihood.

L R SHARMA

Letters

Age is not just a number

This is with reference to "Elderly & lonely" (May 1-15, 2014). It is sad to see the growing apathy of the younger generation towards the elderly. Old age is part of life cycle. Ideally, it should be the responsibility of the children to take care of their ageing parents. But this philosophy has undergone a drastic change in recent times. Today we live in a world where money is valued more than relationships. The preference for nuclear families and the growing trend of children moving out of their homes looking for greener pastures have left elderly parents lonely and struggling to fend for themselves. Worse is when children send away their parents to old-age homes because they neither have the time nor resources to look after them. Young people should remember that they too will grow old someday. Would they like to be thrown away in an old-age home by their children?

JAY

✉ Considering the mounting problems of shelter, old age



CHINKY SHUKLA / CSE

and healthcare the elderly people face, the government should initiate measures that make day-to-day life easy for the greying population. Travel is one such area. The Delhi Transport Corporation has

done a good job of providing monthly passes to the elderly on payment of a nominal amount of ₹250 for non-AC buses and ₹350 for AC buses, which apply to all routes in the city. The Delhi Metro can



<http://www.facebook.com/down2earthindia>

Narendra Modi has dedicated his government to the poor. Can he deliver on his promises?

Obama once came like a knight and was lifted to the presidency by hopes and prayers of millions of Americans. But he flopped like many other presidents before him. Modi is likely to be a failure as well.

SUNIL NEHRU

No, he will keep them poor for five years and approach them just before the next election to seek votes.

ISMAIL MOHAMMAD

Hopefully, the scenario will change for

good. A common man, who was once a tea vendor, is now the PM, and he won the elections by defeating family politics. His victory has shown India the beauty of democracy.

ANKUR VYAS

Yes, he will change the scenario. Poverty will increase manifolds.

VIRINDER SINGH

You are expecting him to do something the Congress could not do in 60 years.

SANKHDIP DAS

do its bit. It is common to see elderly people struggling to find a place in the crowded metro. Although a few seats are reserved in each coach for senior citizens, these are insufficient. The authorities should introduce a special coach for senior citizens, just like they have reserved a separate coach for women passengers. Auto and taxi drivers could also be sensitised to offer concession in the fare for senior citizens.

MAHESH KUMAR

Warning signs

This is with reference to the cover story, "Flat in 20 days" (April 16-30, 2014). Hailstorms that battered Punjab, Uttar Pradesh, Rajasthan, Madhya Pradesh, Andhra Pradesh and Maharashtra were shocking. The government should prepare for such events by putting in place mandatory crop insurance, better forecasting systems and storage facilities.

JACOB SAHAYAM

Forests hostage to IFS

It was shocking to read about the Comptroller and Auditor General's report on how officials of the Indian Forest Service (IFS) are exploiting the country's premier forestry research body ("Jungle raj", May 1-15, 2014). The Indian Council of Forestry Research and Education (ICFRE) was formed to undertake research aimed at increasing the forest cover and educating people about forest conservation. This calls for scientific skills and expertise. The body also needs sufficient funds. But IFS officers who now hold top positions in the body have



RICHARD MAHAAPATRA / CSE

played a spoilsport. Neither do they have the necessary qualifications to run ICFRE nor do they encourage forest research and development. They are only interested in securing privileges. If ICFRE scientists are not allowed to function independently, the country's forests and biodiversity will suffer.

FARIDA TAMPAL

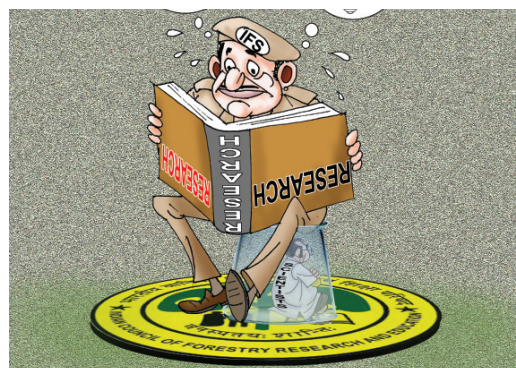
Lessons from Bangladesh

It was a delight to read "Seeds of hope" (May 1-15, 2014). The article shows how out-of-the-box thinking has helped farmers in northern Bangladesh overcome a yearly famine-like situation. Millions of Indian farmers are affected every year by drought or extreme weather events.

Following such disasters,

depressed farmers end their lives. When reading the article, I noticed that farmers everywhere face largely the same issues: failure of crops and debts. Indian farmers should learn from their Bangladeshi counterparts and try to address the issues that result in crop failure, rather than ending their lives.

ANUPAM PAUL



BUDHACHANDRA SINGH

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Six million voters chose none-of-the-above option introduced in the 2014 general elections



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GREEN AGENDA FOR NEW GOVERNMENT

Get the focus on environment and health, Mr Prime Minister

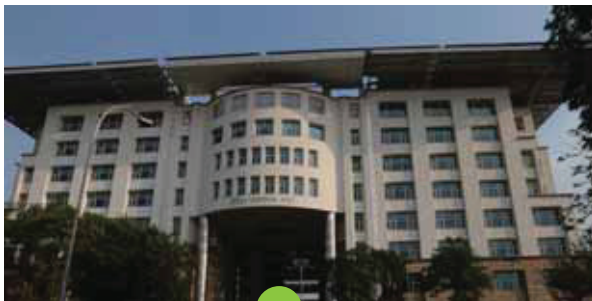


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Envisaged to be a trendsetter, Indira Paryavaran Bhawan has not turned out to be resource-efficient



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DNA-based drug delivery system to accurately target cancer cells



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Should the Jarawa tribe stay isolated to conserve its cultural identity and avoid dangers of outside world?



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Shows exhibiting people in their native surrounding were common in the 19th century

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HOUSE FULL OF BROOMS

Arna Jharna museum in Rajasthan has a collection of 160 varieties of broom

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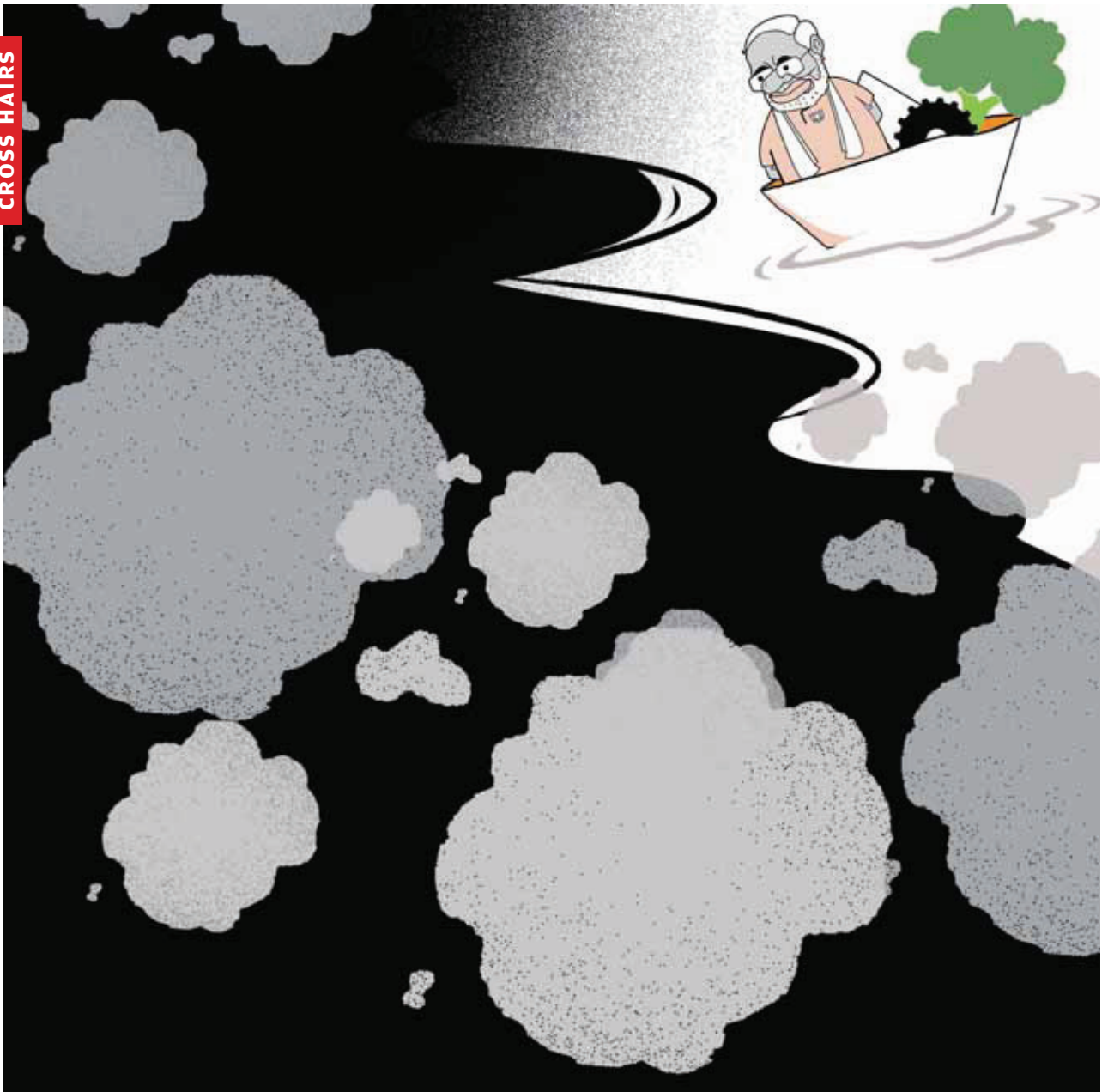
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NABRINA SINGH

6 million votes for nobody

CLOSE TO 6 million voters pressed the none-of-the-above (NOTA) button in the recent general elections. This is the first general election where this option was available to the voters. The highest number of NOTA votes were cast in Uttar Pradesh (590,000), followed by Gujarat (430,000). According to a study done by

The Hindu group of publications on NOTA, on an average about 10,000 NOTA votes were cast in each constituency.

The report also says twice as many NOTA votes were cast in Scheduled Tribe constituencies as in general constituencies. ■

53%
of the total consumption
expenditure by an
average rural Indian
is on food

Source: NSS Report No. 555

WATER & SANITATION



Slow and unsteady

SUB-SAHARAN Africa and South Asia continue to see stunted progress in achieving the Millennium Development Goals (MDGs) for drinking water access and sanitation. A recently released global progress report by the World Health Organization and the United Nations Children's Fund highlights the poor growth of the two regions, while saying 116 countries have met the goals for drinking water access and 77 countries for sanitation.

It says despite accelerated efforts to improve drinking water

access, South Asia and sub-Saharan Africa continue to have the lowest levels of coverage. As a result, two out of every five people without access to drinking water live in Africa. The report says 46 countries still have less than half their population without access to improved sanitation facility. The report also says South Asia is improving its sanitation coverage at a higher rate than sub-Saharan Africa. ■

(For more: <http://goo.gl/YSQW7b>)

Supreme Court nod to Kudankulam

THE SUPREME Court has refused to decommission the much-opposed Kudankulam nuclear power plant in Tamil Nadu. Chennai-based activist G Sundarrajan petitioned in the apex court to close the project because it failed to adhere to the safety measures prescribed by the court. The apex court had

okayed the plant last year and had directed the project developers to comply with a list of safety measures before commissioning the plant. A Bench led by Justice K S Radhakrishnan noted that most of the directions had been dealt with by the developers and that there was sufficient time left to fulfil the



remaining goals. Prashant Bhushan, who represented Sundarrajan in the court, argued that a team headed by a former chairperson of the Atomic Energy Regulatory Board be constituted to examine whether the court directions are being properly implemented. But the court rejected the demand. ■

Ban on bullfights

The Supreme Court has banned the use of bulls in Jallikattu, a traditional bull-taming festival in Tamil Nadu. The decision comes three years after the environment ministry included bulls in the list of animals that should not be trained as performing animals. The court has also banned bullfights and bullock cart races. The court order came on an appeal filed by Animal Welfare Board of India (AWBI) and People for Ethical Treatment to Animals (PETA), against a judgement delivered by the Madras High Court in 2012, allowing Jallikattu.

Flood vacations for Bihar schools

THE BIHAR government has announced monsoon vacations instead of the usual summer vacations for schools in 14 flood-affected districts. Chronic floods in August and September result in low attendance in the schools in the districts. As a result, the schools are not able to maintain the academic calendar of 210 working days in a year, specified under the Right to Education Act.

The state government first proposed monsoon vacation two years ago, but the idea could not be implemented because of lack of community involvement. This year, the government held meetings with village residents and brought them onboard. Government officials say summer classes would address the problem of undernutrition among the poor as the students will receive midday meals during summers. ■

New formula for drug trial victims

THE UNION health ministry has released a draft formula to determine the compensation for victims who suffer serious adverse effects during clinical drug trials. According to the draft, patients whose expected mortality is 90 per cent or more within 30 days after the trial, should receive ₹2 lakh. In case of death,



the compensation would be ₹8 lakh, which has been set as the base amount. In case of permanent disability, the compensation would be 80 per cent of the base amount along with a lump sum amount deposited in the bank. The deposited amount should give a monthly interest equivalent to half of the minimum wage of an unskilled worker in Delhi. ■



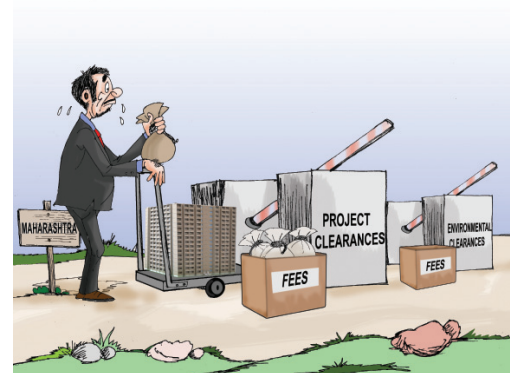
"If you want to save the environment, you need to shut down the Ministry of Environment and Forests and the state pollution control boards."

– Ramesh Agrawal, Activist, Goldman Environment Prize recipient

Developers to pay for clearances

DEVELOPERS WILL now have to pay a fee for getting project clearances in Maharashtra. The Maharashtra Department of Environment has issued a government resolution saying the fee will be used to carry out investigations for clearances. The new fee will range between ₹1 lakh and ₹15 lakh. The State Environment Appraisal Committee and the State Environment Impact Assessment Authority will use the fee

to pay remuneration and allowances to committee members, and also to pay for other purposes such as meetings, and holding public hearings. At present, the state government is incurring the cost for environmental clearances. The state resolution says Gujarat and Tamil Nadu are already charging a similar fee, and the Central government has also permitted Coastal Regulation Zone committees to charge a fee. ■



BUDHACHANDRA SINGH

Turn over a new leaf

There is an urgent need for reforms in door manufacturing in India.

66

More than 12 lac trees every year are required to feed the infill needs of over 100 lac doors each year."

India is a unique country which utilizes timber batton infill in the flush and skin doors; a primitive process, discarded globally many decades back.

We must say goodbye to our obsession for timber filled doors. You may be aware that the concept of recycling wood scrap as an infill in doors is no more a reality as the saw mill operations are getting smaller with reduction of timber availability and on the other hand there is an explosion of construction due the rise in housing needs all over India. More than 12 lac trees every year are required to feed the infill needs of over 100 lac doors each year. Realizing, the bare facts and non sustainable practices other countries have already switched to ecofriendly infill boards like the tubular boards which are 100% made from recycled wood wastes. We should also change... It is too late already.

THE TUBULAR INFILL BOARDS ARE ECOFRIENDLY AND GREEN PRODUCT INITIATIVE replacing the 80% of timber used internally as door infill which dramatically improves the performance of the door in following manner: These filler cores are already in use in 65 countries worldwide for last 63 years.



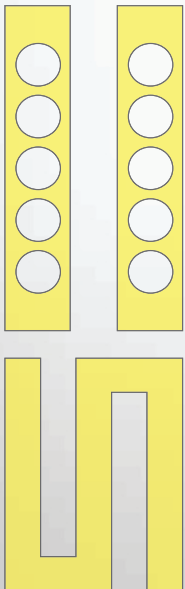
SOUND INSULATION

Extruded tubular and solid boards offer a wide range of sound insulation results for light weight construction as well as high end solutions.



FIRE RESISTANCE

The board being produced by Extrusion method the particle direction is predominantly vertical to surface which in case of exposure to fire provide a low rate of burning. Sauerland offers full support for safe fire door constructions.



Sauerland Spanplatte

CONSTRUCTION

The density in solid areas i.e. walls of board is high 520 Kgs/m³. Further the arch principle as in case of construction of dams or bridges give high impact resistance.



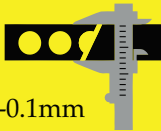
STRAIGHTNESS

The tubular structure also helps the door to maintain straightness under climatic variations.



THICKNESS TOLERANCE

Critical thickness tolerance of +/-0.1mm in the board gives rid of telegraphing as the board calibrated board gives a beautiful surface finish and a good bond between the skin and the board.



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What's the fuss about Bt brinjal?

MOHAMMAD RAFIQUL ISLAM MONDAL,

director-general of Bangladesh Agricultural Research Institute (BARI), is among the handful of people who have tasted the first genetically modified (GM) food grown in his country. "See, nothing has happened to me," he says. The brinjal came from the fields of three of the 20 farmers chosen to cultivate the vegetable. In an interview to **JYOTIKA SOOD**, Mondal explains why Bangladesh decided to grow GM crops. Excerpts



Why did Bangladesh decide to grow Bt brinjal when India and the Philippines had already rejected it?

Brinjal is grown year-round in Bangladesh and is an important source of income for small-scale farmers. It is the third most important vegetable in the country in terms of acreage. But we lose 50 to 70 per cent of the yield because of infestation of fruit and shoot borer (FSB), an insect pest. Farmers were finding it difficult to tackle the intense pest attack and started adopting scores of methods to destroy them—from using highly concentrated pesticides to pesticide cocktails. But there was no respite. At this time Bt brinjal was the only solution and we accepted it.

As far as India is concerned, I think it maintains double standards. It grows Bt cotton (90 per cent of the cotton grown in India is genetically modified), consumes edible oil from it, yet bans Bt brinjal. All over the world, developed nations are growing GM maize and GM soyabean. South Asian countries, including India and Bangladesh, import soybean oil and maize products from these countries. So what is the fuss about?

When did BARI decide to start Bt brinjal project? Did your scientists carry out independent studies?

Advantages of Bt brinjal had already been reported in various studies conducted outside Bangladesh, especially in India. So in 2006 we decided to start the project. After the Bangladesh government gave its approval, we imported seeds from Maharashtra Hybrid Seed Company Ltd (MAHYCO), an Indian company.

The seeds were kept in an isolated field at BARI headquarters and seven regional agricultural research stations in Rangpur, Jessore, Mymensingh, Tangail, Bogra, Dinajpur and Jamalpur districts. The fields were isolated by placing barbed wires around it and we did not allow same crop species to be grown within 200 metres. We saw a sizeable increase in yield.

A variety of safety studies were also conducted before we started the project. These included feeding studies on chicken, fish and cow. The studies demonstrate that the gene inserted into brinjals does not cause adverse effects on humans, wild and domes-

ticated animals, birds and fishes, and non-target insects.

Bt brinjal went through a rigorous safety mechanism over seven years before it was allowed to be commercially cultivated.

Will there not be intellectual property rights issues? Will BARI and Bangladesh government pay royalty to MAHYCO?

Absolutely not. Bt brinjal is a government-owned and government-led project. Although it is funded by United States Agency for International Development (USAID), BARI is the sole developer and owner of local Bt brinjal varieties. BARI retains responsibilities as well as the rights of ensuring that Bt brinjal is safe for farmers to cultivate and for consumers to eat. Given that the technology was donated as a public good for the benefit of small farmers, it is obvious that BARI has no royalty obligations to MAHYCO or Monsanto. MAHYCO was the original developer of Bt brinjal in India. But what it developed was hybrid, we developed varieties. MAHYCO donated the gene it licensed from Monsanto to BARI to create Bangladeshi Bt brinjal cultivars in farmer-preferred varieties.

“Since the technology was donated as a public good for the benefit of small farmers, BARI has no royalty obligations”

There is no profit motive in the project—it involves new seeds developed in the public sector for the common good of the wider community. Seeds will be distributed at a nominal cost, far below the production cost. Besides, there is no way farmers can be restricted from saving seeds and replanting them.

There are international studies which show that GM crops have many harmful effects. A study conducted on rats by French scientist Gilles-Eric Seralini shows the rats developed tumours and other problems when they were fed GM maize.

There are reports on toxicity of GM crops,

but they are very few. On the other hand, the majority of the scientists support GM in their studies. Bangladesh does not have a toxicology laboratory, so we could not conduct in-house toxicology tests for Bt brinjal. However, we referred to the toxicology reports done in laboratories accredited by the Government of India. Before starting the project, we had 13 reports stating that Bt brinjal is safe for consumption.

All these anti-GM activists have no scientific basis for rejecting it. If the Bangladesh government thinks there is a need for further investigation, we would go ahead with it.

If you were so convinced, why did you limit Bt brinjal to 20 farmers?

When Bt brinjal was approved for commercial cultivation, we had limited number of seeds of genetically modified local brinjal varieties—Bt Uttara, Bt Kajla, Bt Nayantara and Bt ISD006. In January this year, the government distributed seeds and saplings to 20 farmers from four different agroclimatic zones for cultivation in Jamalpur, Pabna, Rangpur and Gazipur districts. The four zones have high FSB infestation.

For the next season, seed multiplication is already being undertaken by the Bangladesh Agricultural Development Corporation. By the next year, we want to introduce Bt gene in five other brinjal varieties. All these Bt brinjal varieties are very popular among farmers and are region-specific. In the next five years, the government plans to bring 20,000 hectares across 20 districts under nine Bt brinjal varieties.

How did you convince farmers to grow Bt brinjal?

The farmers we chose were given free seeds and monetary assistance (600 Bangladeshi takkas) to buy fertilisers and other extension services. We told them about the advantages of growing Bt brinjal. These are not hybrids, so farmers can keep the seeds for the future the way they keep ordinary variety seeds. So they do not have to keep buying the seeds. The best part is that it requires less pesticides, so it does not pollute the environment and people get to eat pesticide-free brinjals. We showed them the example of India



“India maintains double standards. It grows Bt cotton, consumes edible oil from it, yet bans Bt brinjal”

where farmers who are growing Bt cotton have prospered.

There are media reports on crop failure, especially from Gazipur district.

The general sowing season for brinjal is October to December. It is a long duration crop. What happened with Bt brinjal project was that the seeds were distributed in January. It resulted in late sowing. Due to rains in Gazipur, especially in April, the soil absorbed too much moisture. It resulted in the wilting of plants. The farmers here are having problems growing the crop because of the soil condition. But as many as 15 farmers have reported success.

As far as media reports are concerned, journalists observed the refuge (non-GM-plants grown around GM crops) and filed stories based on it assuming that Bt brinjal crop is affected. The journalists may be part of the anti-GM campaign. When we asked them to visit our research station, they did not even respond. We have already sent them a court notice.

What is GM crop's future in Bangladesh?

It is very promising. Soon we will be ready with potato varieties and Golden Rice. The rice is genetically modified to introduce vitamins in the grain and fight malnutrition. Currently, we are also working on herbicide-tolerant crops. With government support, we see our future bright and prosperous; we see ourselves moving towards self-sufficiency. ■



COURTESY: CORNERSTONEMAG.NET

Contours of inequality

Global estimates of the unmet energy needs in India have been available for some time. These only indicate whether the shoe pinches, if at all. In a new series of analyses we try to understand where the shoe pinches

S B AGNIHOTRI, P C MAITHANI

ACCCESS TO ENERGY is an important determinant of the quality of life. Inequality of access to energy for cooking, lighting and livelihood purposes has engaged the attention of researchers, policy planners and activists in recent years. In 2005, India launched the ambitious Rajiv Gandhi Grameen Vidyutikaran Yojana that aimed at universal electricity access by 2009. Similarly, efforts towards universal access to modern cooking energy were initiated by creating an LPG distribution network and deploying renewable energy-based cooking energy solutions. Internationally too, in April 2011, the UN General Assembly declared 2012 as the International Year of Sustainable Energy for All.

Increased realisation of the futility of business-as-usual approach—expanding conventional energy infrastructure, particularly power—has led to a serious search for alternatives. Renewable energy solutions provide one such promising alternative.

But before coming to solutions, it is important to

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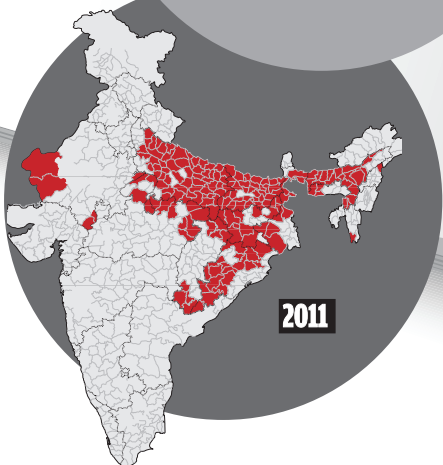
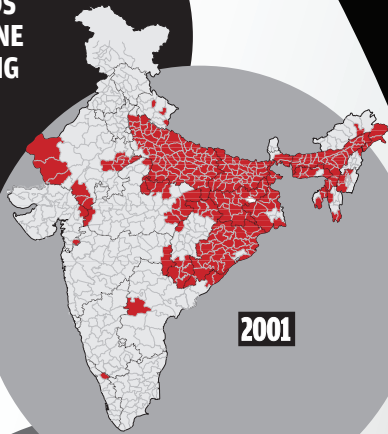
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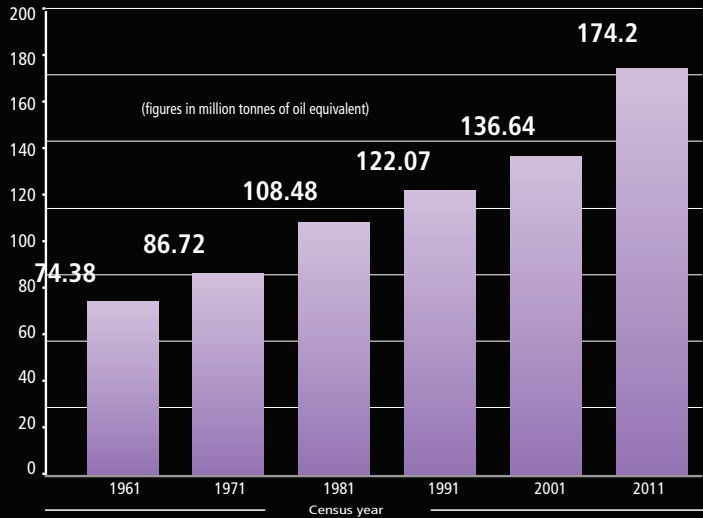
Skewed energy equations

45 per cent of rural population still depends on non-commercial energy sources because it does not have access to electricity

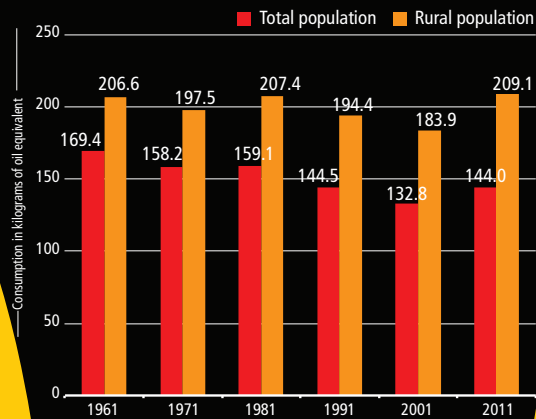
REGIONS WHERE MORE THAN 50% HOUSEHOLDS USE KEROSENE FOR LIGHTING



India's consumption of non-commercial energy



Per capita consumption trend of non-commercial energy



Source: Census of India for population data and Planning Commission data for non-commercial energy

GRAPHIC: VIVEK BHARDWAJ

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assess the nature and extent of the problem in the Indian context. This can be done at three levels:

- Macro,
- Meso, using data sets like the National Sample Survey Office survey
- Micro, using the Census data at the district and the sub-district levels and, if possible, at the village level.

The macro picture indicates the gravity of the problem. To begin with, we will concentrate on this picture. According to Census 2001, as many as 84.7 million households did not have access to electricity. In Census 2011, the figure has come down marginally to 80.7 million households.

A break-up of the country's population into rural and urban segments indicates that about 75 million rural households (44.7 per cent of rural population) lack access to electricity, while only 5.8 million urban households (7.3 per cent of urban population) lack such access. This makes the extent of rural urban inequality obvious.

The fraction of non-commercial energy in the energy consumption basket is another macro-indicator. Energy forms that are not sold in the regulated markets and are usually produced and consumed by an individual household are referred to as non-commercial energy. Use of non-commercial energy has increased in absolute terms from 74 MTOE (million tonnes of oil equivalent) in 1961 to 174 MTOE in 2011. But it has come down in per capita terms from 169 KGOE (kilograms of oil equivalent) in 1961 to about 144 KGOE in 2011—not a significant decrease (see 'Skewed energy equations' on p20).

Here it would be pertinent to point out that the latest McKinsey report (January 2014) puts the current consumption of non-commercial energy at 160 MTOE. The report also reckons that consumption will stay at 160 MTOE till 2030 in a business-as-usual scenario. Even in an optimistic scenario aiming at energy independence, consumption of non-commercial energy is projected to come down only to 147 MTOE. It is apparent that the segment using non-commercial energy is no one's concern.

This can be further elaborated when we

Average electricity consumption per household per month
(Not per capita per month; given that lower income deciles have larger household size the consumption inequality is even more glaring in per capita terms)

Decile class of MPCE	Monthly per capita expenditure (MPCE) by decile (in ₹)		Electricity consumed per household (excludes non-consuming households) (in kWh)		Electricity consumed per household (includes all households) (in Kilowatt hour or kWh)	
	Rural	Urban	Rural	Urban	Rural	Urban
1	505	707	35	53	16	43
2	664	979	40	66	22	61
3	774	1,192	42	76	25	73
4	876	1,401	43	85	29	82
5	977	1,632	49	93	35	90
6	1,100	1,908	52	103	40	101
7	1,249	2,246	56	111	44	108
8	1,452	2,730	59	114	50	111
9	1,786	3,563	67	135	58	133
10	3,409	7,639	81	196	75	194

Source: Census of India for population data and Planning Commission data for non-commercial energy

SAYANTAN BERA / CSE



According to Census 2001, as many as 84.7 million households did not have access to electricity. In Census 2011, the figure has come down marginally to 80.7 million

look at the meso picture. The economic deciles-wise energy consumption among rural and urban households not just reveals the rural versus urban consumption inequality, but also shows the intra-rural and the

intra-urban consumption inequality (see 'Average electricity consumption per household per month'). The data makes it clear that there is considerable inequality in energy consumption per household per annum in the rural area. What is more dramatic is the data related to the regional inequality in the access to electricity for lighting purposes in rural households based on the Census 2011 data. A compact cluster of districts in the eastern and northern regions still has nearly half the households using kerosene for lighting in 2011 because they lack access (see 2011 map on p20). This data reinforces the urgency of eradicating basic energy poverty, especially since deprivation in this cluster is a strongly enduring one: even in 2001, it was nearly the same cluster where more than 50 per cent households were using kerosene as source of lighting.

More on this in the next piece where we will discuss the different sources of fuel and lighting. ■

S B Agnihotri is Secretary Coordination, Cabinet Secretariat, New Delhi.

P C Maithani is Director in the Ministry of New and Renewable Energy. Views expressed by the authors are their own and do not represent views of their institutions

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Forecasting failure

Met department has not learnt lessons from the Uttarakhand tragedy. It remains ill-equipped

KUNDAN PANDEY

I T IS NEARLY a year since Uttarakhand witnessed one of the worst natural calamities in Indian history

due to sudden cloudbursts and flash floods. On June 17, the state received 340 mm rainfall, an astounding 375 per cent above the daily normal rain during monsoons. Residents and tourists in Badrinath got no time to move to safe areas, which resulted in loss of thousands of lives and property. The state government was charged with being too slow in rescuing and relocating people. When chief minister Vijay Bahuguna resigned owning responsibility for the administrative failure, he also accused the India Meteorological Department (IMD) of failing to warn the state government of the impending danger.

Monsoon is just a few weeks away, but IMD has done precious little to improve its outdated weather forecasting system.

After facing widespread criticism, the department promised to augment its forecasting mechanism and install better equipment to bring accuracy in weather predictions. It seems the promises were made only to assuage people's anger.

IMD took months to announce its ameliorative steps. The department organised a meeting in early May where state chief secretary Subhash Kumar announced that IMD would install three doppler radars, 75 rain gauge meters, five micro rain radars, four compact radars, 75 weather stations, besides introducing a helicopter support weather system. Doppler radar is the key forecasting tool that uses doppler effect to measure the velocity of objects located at a distance. Rain

**UTTARAKHAND
A YEAR AFTER**

gauge measures precipitation while micro rain radar is used to retrieve quantitative rain rates and drop size distributions. Compact radar tracks faraway people and vehicles.

Within a few days the Centre sanctioned ₹116 crore for the project. It also asked the department to identify land for the purpose. IMD had been complaining that the state government starts dilly-dallying whenever it asks for land to set up weather stations.

The project would take three to four years to complete. Given the tremendous loss Uttarakhand suffered and the promises the state government had made, more action on priority basis was expected from IMD.

At present, the state does not even have its own radar. It requests for data from Delhi and Patiala, says an IMD official requesting anonymity. "Planning for augmentation of the weather prediction system has been going on for the last 10 years," the official says.

Last September, IMD scientist B P Yadav said in a department meeting that it had already commissioned nine doppler weather radars in the Himalayan region, including Uttarakhand, Himachal Pradesh, and Jammu & Kashmir. He also announced commissioning of 18 micro rain radars, 10

lightning detection systems and 12 compact severe weather detection radar systems. But on ground nothing has changed, the official says.

L S Rathore, IMD managing director, says the project to augment the department's weather forecasting was conceived recently and will take time to complete. "It is a long process which involves policy decisions, tendering, procurement and installation," he says. "Its completion may take a few years."

Weather forecasting in the Himalayan region is a challenging task because of its complex terrain, says Anand Sharma, scientist at IMD Dehradun. "Forecasting is completely different in the hills. One radar cannot cover long distances," explains G P Sharma, head of Skymet, a private forecasting agency. Hilly areas require special radars called X-band radar. According to him, hilly states like Uttarakhand need at least 14 such radars. S-band radars, which are used in the planes, can cover long distances but cannot catch minute details.

Across the country, there are quite a few IMD radars which do not function, says the department official. The radar at Dibrugarh has been out of order for the past six months, while the Nagpur radar has not been functioning since April 30. The situation is similar in Bhopal and Jaipur.

Climate in the Himalayan region is showing signs of change. After last year's destruction, people are worried what the coming monsoon holds for them. What they need is a sound weather prediction mechanism backed by administrative support, which they are unlikely to get this season. ■

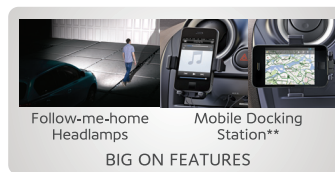
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Mr Modi, Wish us a Happy Environment Day

SUNITA NARAIN

EVERY NEW GOVERNMENT comes with baggage and opportunity. The problem is since the government is new, it wants to undo what has been done in the past, make new schemes and start again on the learning curve. The opportunity is that there is a new drive to do more, to deliver and to push for change.

Keeping these two facts in mind, we are presenting the Environment and Development Agenda for the BJP government that took charge on May 26, 2014, ahead of the World Environment Day.

First, what we do not want the new government to do. One, in the name of development it must not brush aside the idea that the environment, forest and wildlife concerns are critical. This does not mean we believe the current environment and forest clearance system is working. We want a drastic reform of the system so that it works for environmental protection. This requires reducing multiplicity of clearances, removing archaic laws and strengthening regulatory processes. The new government must not be bullied by the Supreme Court into creating an additional environmental regulator. This will only add to the institutional mess.

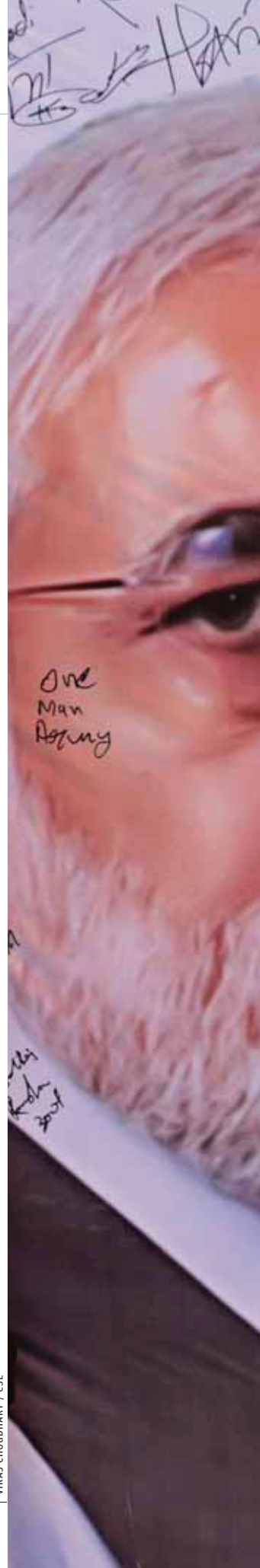
Two, we do not want the new government to discard old schemes which were introduced for inclusive growth. All the schemes for rural employment, water and sanitation, housing, nutrition and education are crucial. Without these, there is no idea of India.

But again, we want a change. We want delivery so that people have access to clean water, sanitation, employment, food and education. We have lost too much time making schemes on paper and then fiddling to make them even better, without ever focusing on delivery.

It is our belief that delivery requires good old-fashioned governance systems, which need constant monitoring and attention to detail. The delivery of schemes does require states to get more autonomy and control over funds and programme design. In the current system the Centre makes the plan, provides the money, but it is the state that has to operationalise the system of implementation. There is a huge disconnect. It is the state chief minister who should be accountable for delivery; it is he or she who should get the brickbats or the credit.

It is also our belief that people's aspirations have changed. They want more. They should get more. They should not be short-changed, once again, in the name of development, which benefits only some.

The new prime minister has famously and rightly said that toilets are more important than temples. This is the real agenda for the new government.





First, clean the air

Summon political will to meet clean air standards, enforce stringent emission norms and promote public transport **ANUMITA ROYCHOWDHURY**



per cent of Indian cities are critically polluted. The level of particles with a diameter of less than 10 microns (PM10), which go deep inside the lungs, is 1.5 times above the national standard

➤ **13 of the world's 20 worst polluted** cities are in India

➤ Air pollution is the **fifth largest** killer in India

Life between 2011 and 2030

➤ Daily travel trips will double

➤ Share of public transport trips will fall from **26% to 16%**

➤ Share of personal vehicles trips will increase from **34% to 51%**

➤ Traffic will crawl at **8 km/hr** compared to **16 km/hr** now

➤ A person dies every four minutes in a road accident, while almost every minute an accident happens in India

JUST AS the Bharatiya Janata Party was getting ready to form the new government, India hit an all time low on the WHO list of polluted cities. Its report, released in May, noted that 13 of the 20 worst polluted cities across the world are in India. Air pollution has also emerged as the fifth largest killer in the country. Though shocking, the findings do not come as a surprise.

Indian cities are bursting at the seams with cars, two-wheelers and a large number of diesel-powered vehicles that belch toxic fumes. At the same time, the share of public transport, walking and cycling is drastically declining. Worsening air pollution has also exacted a significant toll on the country's economy. A recent estimate by the World Bank shows that the health cost of particulate matter pollution (particulate matter less than 10 microns, or PM10, can penetrate deep into the lungs) accounts for 3 per cent of the country's GDP. Clearly, the new government faces a daunting task of curbing air pollution. It will be able to turn the tide only with hard decisions and determination. Here are a few words of advice:

1. Implement national clean air action plan to ensure that all cities meet clean air standards by 2020-21. Strengthen air quality monitoring systems in all states and issue daily air quality alerts with health advisory for people to take precaution.

2. Introduce stringent emission standards. To begin with, enforce Bharat Stage

(BS) IV emission standards across the country. Cars should meet BS V standards by 2016 and the country should leapfrog to BS VI by 2020-21. Only BS VI norms can effectively curb diesel emissions, which WHO classifies as class one carcinogen for its strong association with lung cancer. Restrict the number of diesel cars and SUVs using fiscal measures like additional excise duty. India cannot afford to motorise based on technologies that are nine to 14 years behind those used in Europe.

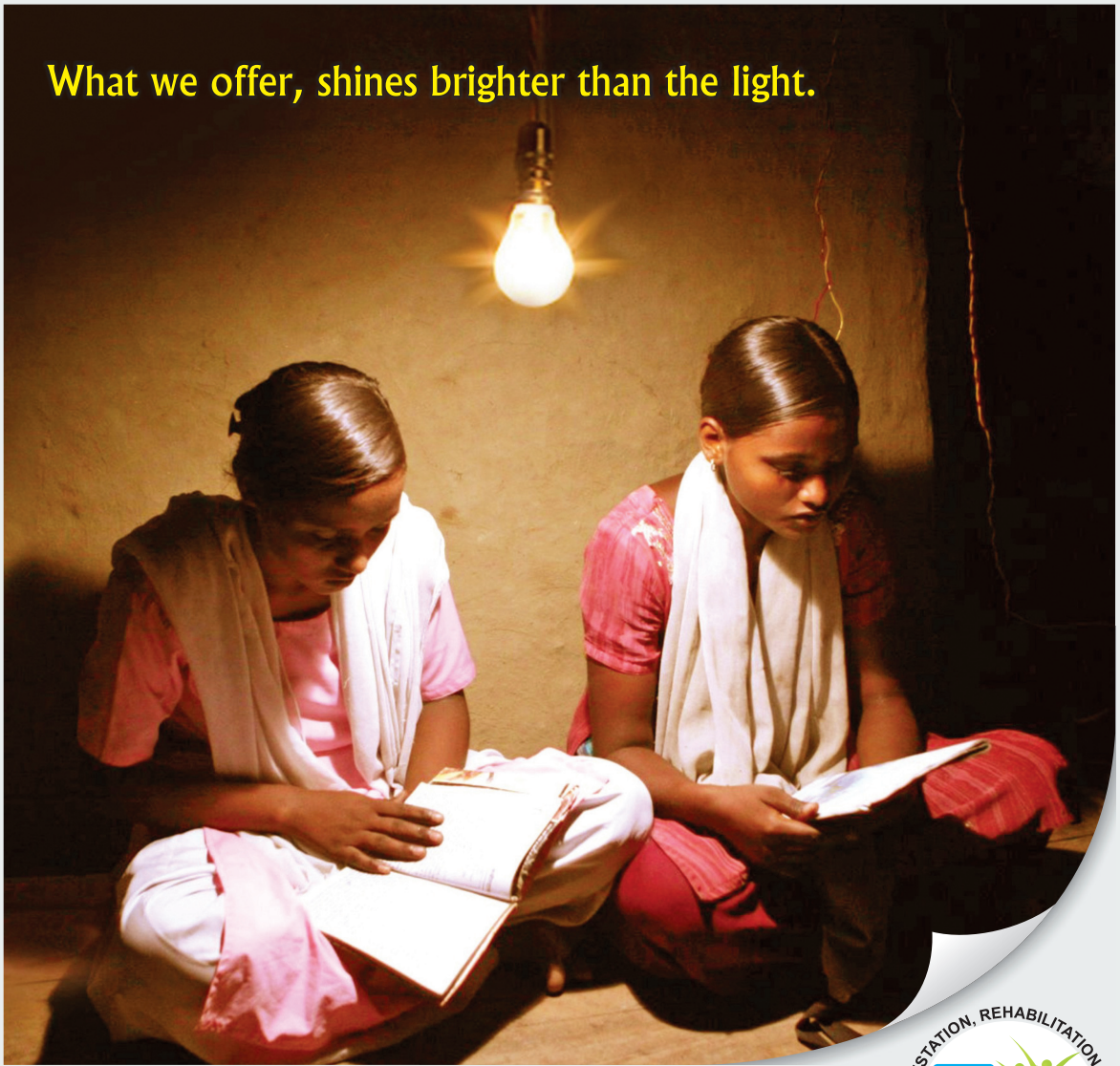
3. Implement favourable taxation policy for promoting clean fuels like CNG. Only an effective differential between CNG and diesel prices can incentivise CNG. Encourage advanced clean vehicle technologies like electric vehicles with fiscal incentives.

4. Increase Central funding substantially to scale up affordable modes of public transport system in cities. Use reform-based funding to integrate these systems and to install safe and well-designed walking and cycling infrastructure and para-transit systems. At least 80 per cent of daily travel trips in cities must be met by public transport by 2020-21. Reform Central taxes and state road taxes to eliminate burden on public transport and recover the revenue loss by imposing higher taxes on cars. Create a dedicated urban transport fund. Promote urban design that allows people to live closer to jobs, education, recreation and other services.

5. Restrict use of personal vehicles. City authorities must eliminate free parking, organise and limit parking and charge parking fees to recover the cost of valuable public land and environmental impact. ■

Particulate matter pollution exacts a health cost of 3% of India's GDP

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Healthy rivers are crucial

This will require innovative sewage treatment and tough enforcement of pollution norms

SUNITA NARAIN

76

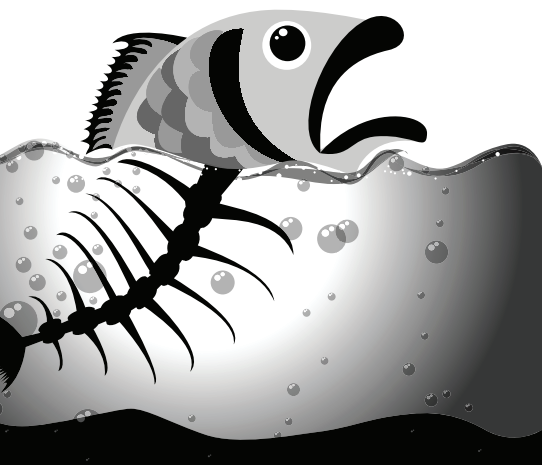
of 150 major rivers

in India are polluted, with biological oxygen demand (BOD) 10-30 mg/l. BOD safe for bathing is ≤ 3 mg/l

> 7,322 million litres of **sewage** from cities goes untreated into the Ganga every day

> 500 million litres of **industrial discharge** from 764 units flows into the Ganga every day

> **80%** of water supplied to households is returned as wastewater



THE BJP-LED government has said it is serious about cleaning the Ganga. It must know that every river in India is like the Ganga. Every river is either dying or already dead. This is because cities take water from them and return sewage, and industries discharge effluents into them.

The river-cleaning model has as yet depended on building sewage treatment plants. This strategy is inadequate. Nearly 84 per cent of Varanasi city is without the sewage network. So is 71 per cent of Allahabad. Engineers will tell the government that they will build the network. This is a pipe dream. Even as they deal with the backlog, there is more that needs to be built or repaired.

Cities do not even have funds to run sewage treatment plants. All in all, the game of catch-up does not work. Change is possible with the following strategy:

1. Make ecological flow mandatory in all stretches of the river. In upper stretches, where the requirement is for critical ecological functions as well as societal needs, it should be mandated at 50 per cent for the lean season and 30 per cent for other seasons. In urbanised stretches, it will be mandated based on the quantum of wastewater released into the river and calculated using a factor of 10 for dilution.

2. Accept that urban areas cannot build

conventional sewage networks at a required pace. So intercept sewage in open drains and take it to treatment plants. Ensure that all new developments treat sewage locally using decentralised systems.

3. Ensure treated effluent is reused or discharged directly into rivers for dilution.

4. Go for affordable water and sanitation solutions. Today, the Centre provides subsidy for building and running sewage treatment plants. Cities do not provide water and sanitation for all. They get expensive

water from farther away, losing some of it in distribution. This is not practical. Cities must reduce water use, pay for water and invest in sewage treatment that is affordable. Central funds must subsidise only those systems that provide for all, not some.

5. Design a garbage disposal system to segregate waste and make a resource out of it.

6. Learn that controlling industrial pollution demands effective enforcement of laws and appropriate technologies for small-scale industries. The Central Pollution Control Board estimates 500 million litres of industrial discharge flows into the Ganga every day. Crackdown on non-compliance and incentivise pollution-control technologies.

7. Recognise lack of sanitation is a national shame. Implement the current programme with obsession. Make this the national mission that counts. ■

Rural sanitation needs obsession for delivery. Sanitation programme must link toilets to water and sewage disposal



Smiles that tell a thousand tales!

In our operations, we are blessed to bond with some very special people. People not daunted by odds, but with the passion and perseverance to overcome them. In doing so, they allow us to work with them to support livelihood generation and environment protection, to create education and health infrastructure.

Above all, they help us fulfill our goal to be a committed corporate citizen. True to the tradition of the Tata Group.

Miss Sonal Natwarbhai, from the Virpura Village in Sanand, Gujarat. Sonal used to sit on the floor and study. Today she and more than 250 other students benefit from the classroom facility upgradation initiative of Tata Motors. The Company has a holistic approach to improving the access to and quality of education. The company supplements its infrastructural support to schools with training of teachers and extra-curricular activities or students.



Mr. Sujit Soren of Gopalpur village in East Singhbhum district of Jharkhand. He was the first in the village to adopt water conservation techniques of the Gram Vikas Kendra society of Tata Motors. Today, the village boasts of perennial irrigation for about 100 acres and about 10,000 fruit and timber generating trees.



Mrs. Rohini Bhanudas Wadekar of Pune in Maharashtra. A widow with three children, she was trained to become self-dependent with technical skills by Tata Motors' Grihini Social Welfare Society.



Mr. Jowahar Ram Paswan of Baranimdih Mohalla of Chaibasa district in Jharkhand. Today, he is an employee of Nav Jagrat Manav Samaj. It became possible when the Nav Jagrat Manav Samaj, supported by Tata Motors, intervened to manage his leprosy and found him a job with a permanent income. Today, Mr. Paswan intervenes to bring comfort to others.

Mr. Man Singh Murmu of Baijnathdih village in East Singhbhum district of Jharkhand. With mostly infertile land holdings, Mr. Murmu and other residents found meeting both ends difficult. Tata Motors helped him lead change by beginning a tree plantation drive. Today, Baijnathdih has a forest of income-generating trees, and a Forest Protection Group to nurture its economic turnaround.



Mr. Vinod Pachpute of Vasuli village in Pune district of Maharashtra. A diploma holder in mechanical engineering, he is also a trustee and an alumni of the Bhamchandra High School in the village – the only one in the vicinity covering seven villages. Tata Motors helped set up the school and continues to support it. About 600 students have passed through its portals till date.



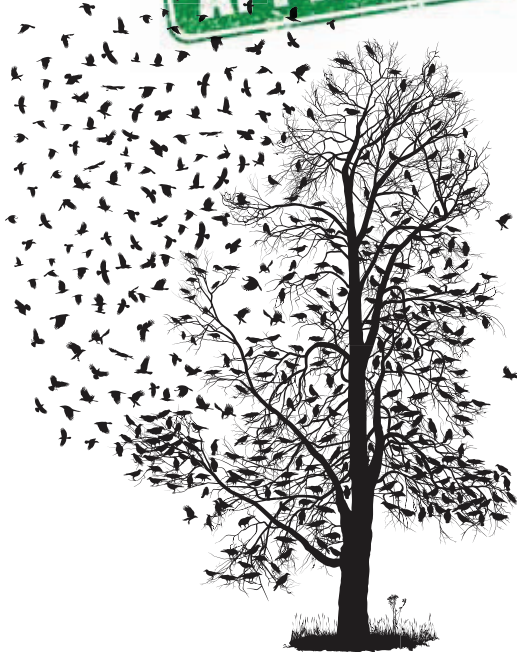
Tata Motors' Sustainability Programme. Striving for Sustainable Change.

99

per cent of projects manage to get environment-related clearance; 94% get forest clearance

- Multiplicity of regulations and regulators help **unscrupulous** elements in industry to bag clearances
- Multiple clearances required separately lead to **delays** and **poor decision-making**
- Government has **no system** in place for independent appraisal of project clearances
- Authorities **lack the capacity** to monitor compliance with clearance conditions
- **Lack of access** to reliable and relevant information related to project clearances make them contentious

APPROVED



Time for reform

India needs to reinvent the way it manages green clearances **SRESTHA BANERJEE**

O **NMAY 16**, as India was anticipating a new government the stock market hit a record high. The unbridled optimism of industry that the BJP-led government will rev up the economy is apparent. The Associated Chambers of Commerce and Industry of India has already prepared an agenda for the new government to achieve 10 per cent economic growth. Chandrajit Banerjee, director-general of the Confederation of Indian Industry, indicated in an article that the government should re-start stalled projects.

Industry lobby portrays green clearances as impediments to growth. But facts speak otherwise. The government had planned to increase the country's thermal power capacity by 78,700 MW during the 11th Five Year Plan that ended in 2012, but only 53,000 MW was installed. This is when the Union Ministry of Environment and Forests (MOEF) cleared plants of 217,794 MW. The 12th Plan, ending 2017, promises another 88,000 MW to cater to the future demand. While the target can be met without further clearances, MOEF has cleared an additional 36,000 MW since April 2012.

Similar is the case with coal. India's current production of coal is 557.7 million tonnes per annum (MTPA). By 2017, coal demand will rise to 980.50 MT, which can be met by realising the 589 MTPA potential of mines cleared during the 11th Plan period. Yet MOEF has cleared additional 67 projects with capacity of 216 MTPA since 2012.

The fact is very few projects get rejected on environmental grounds. In fact, projects

are cleared with full knowledge that the government has little capacity to monitor whether developers are complying with environment clearance conditions. This allows developers to pollute. Protests against such projects make clearances contentious. This affects industries. Clearly, the current system is not working. The new government must reform and strengthen the environment management system and green clearances to safeguard people's concerns.

It's a myth that environmental clearances are impeding growth

1. Consolidate all green clearances, be it related to environment, forests, wildlife or coastal zone, so that decisions can be taken understanding the overall impact of projects.

2. Instead of several regulators, set up an independent body to grant all green clearances. The body should be given enough power and resources to do proper assessment and impose fines and sanctions. It must be transparent and accountable and encourage public participation in green clearances.

3. State pollution control boards (SPCBs), the country's largest environment regulators, monitor projects for compliance under environmental laws. MOEF should utilise the resources of SPCBs to monitor compliance with clearance conditions.

4. The government must provide resources, build capacity and reform institutions for better implementation of regulations. It must urgently strengthen SPCBs as they are the regulators on the ground.

5. All information related to green clearances should be put in the public domain. The process of public hearings must be strengthened and made more transparent. ■



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A US\$ 40 billion corporation, the Aditya Birla Group is in the League of Fortune 500. It is anchored by an extraordinary force of 136,000 employees, belonging to 42 nationalities. The Group operates in 36 countries. Over 50 per cent of its revenues flow from its overseas operations. The Group has topped the Nielsen's Corporate Image Monitor 2012-13 and emerged as the Number 1 corporate, the 'Best in Class'.

Beyond Business -

The Aditya Birla Group is:

- Working in 3,000 villages globally. Reaching out to 7 million people annually through the Aditya Birla Centre for Community Initiatives and Rural Development, spearheaded by Mrs. Rajashree Birla.
- Focusing on: Health Care, Education, the Girl Child, Sustainable Livelihood, Women Empowerment Projects, Infrastructure and espousing social causes.

Highlights:

- Over a million patients treated at 4,000 Medical Camps and its 18 hospitals. More than 1,200 children learnt to smile again as they underwent cleft lip surgery. We helped immunise 6 million children against polio as well.
- At our 42 Schools across India we provide quality education to 45,000 children. Of these 18,000 students belong to the underprivileged segment. Merit Scholarships are given to an additional 12,000 children from the interiors.
- Our Vocational Training Centres and the Aditya Birla Rural Technology Park accord training in sustainable livelihood projects to 80,000 people.
- Our 4,500 Self-Help Groups have led to the empowerment of 45,000 women.

- Working closely with Habitat for Humanity, we have so far built more than 400 houses as part of our community outreach programme, besides supporting the building of an additional 3,800 houses.
- We are also engaged in creating model villages in rural India. We have chosen 300 villages for this transformation - whereby in a five year timeframe the villages would be self-reliant in every aspect, moving out of the "below the poverty line" status. So far more than 90 villages in India's hinterland have already reached the level of model villages.
- To embed CSR as a way of life in organizations, we have set up the FICCI - Aditya Birla CSR Centre for Excellence, in Delhi.
- In line with our commitment to sustainable development, we have partnered the Columbia University in establishing the Columbia Global Centre's Earth Institute in Mumbai.
- Ongoing education, healthcare and sustainable livelihood projects in Philippines, Thailand, Laos, Indonesia, Egypt, Korea and Brazil, lift thousands of people out of poverty.

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15

million hectares

to be transferred to tribal and forest dwellers by 2020 under Forest Rights Act*

➤ Claims over **2.2 million** ha settled

➤ Every village should have a community forest managed by it. So far community titles account for only

2% of total FRA titles

➤ Forest dwellers should have rights over valuable forest produce like bamboo and tendu that can fetch them **₹2,500 crore a year**

* Source: India Forestry Outlook, 2020, MoEF

Of the people, for the people

Harness the development potential of the Forest Rights Act **KUMAR SAMBHAV SHRIVASTAVA**

WHEN THE FOREST Rights Act (FRA) was enacted in 2006 it was supposed to reform the forest regime that continued since the colonial era and denied tribals and other forest-dwelling communities the rights over their ancestral land and forest resources. Ensuring livelihood and food security of the poorest of the poor is at the core of this legislation. Seven years on, the Act is yet to live up to expectations.

People's anguish became clear during this general election when the ruling Congress party at the Centre faced rout in most tribal constituencies that had been its traditional strongholds. Political analysts lay the blame for the debacle of the Congress-led United Progressive Alliance government on its inability to tap FRA's development potential. The new government must implement FRA in letter and spirit and include it in its key development agenda if it wants to continue attracting tribal votes.

1. As per FRA, forest villages must be converted into revenue villages. Without this, the village cannot benefit from development programmes of the government. The change in status also keeps villages out of the administrative control of forest departments. But no state has speeded up this legal requirement. The Union tribal affairs ministry must pursue the matter as a prior-

ity so that the law's development potential is realised.

2. FRA is an attempt to humanise forest management. According to its rules, village communities must have rights over their forests. But in a blatant violation of the rules, forest departments tactically resist granting such rights. Small wonder that community forest titles account for about two per cent of the total FRA titles. The government should implement the next phase of FRA focusing on community

forest rights in a time-bound manner.

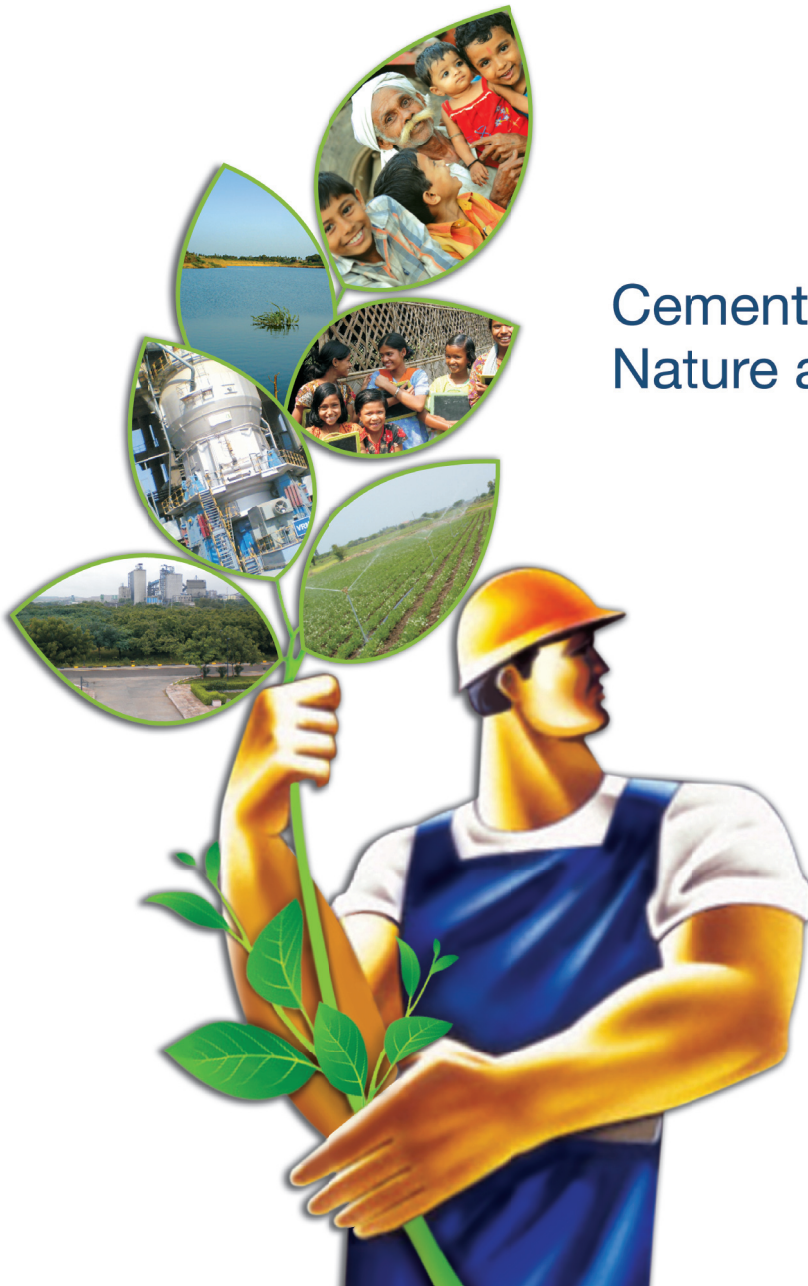
3. FRA, for the first time, defines minor forest produce (MFP) and places valuable produces like bamboo and tendu under its ambit. It also grants forest dwelling com-

munities the right over MFPPs to ensure their livelihood and increase their income. Though there has been a sharp increase in demand for the right, the forest department is reluctant to cede authority over forest produce. The new government should bring in more clarity on the roles of forest department and introduce minimum support price for all minor forest produce.

4. FRA aims at reinventing the colonial forest regime. But it cannot be implemented properly until the forest department undergoes similar reforms. The new government should immediately reform forest governance on lines of the Administrative Reforms Commission. ■

Ensuring livelihood and food security of the poorest of the poor is at the core of the Act





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Social Responsiveness

- Over 2 million people covered across 10 states.
- Water management.
- Livelihood generation.
- Education & healthcare.
- Women empowerment.

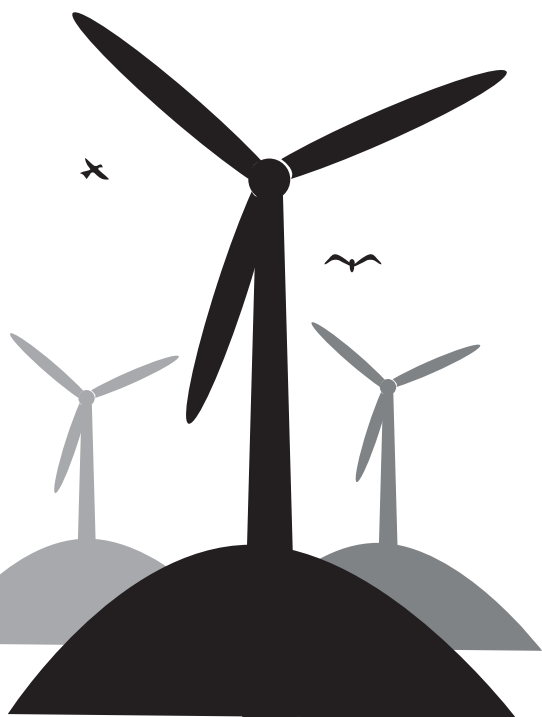
I CAN.

Sustainability... Our way of life

778

kWh/yr is the per capita energy consumption of India. By contrast, global average is 2,600 kWh/yr

- About **306 million** people, mostly in rural areas, do not have access to electricity
- **808 million** people depend on traditional biomass, such as firewood and dung cake, for cooking
- Though coal accounts for **59%** of power generation, it is responsible for **68.5%** of carbon emissions
- Renewable energy-based **mini-grids** have emerged as the solution for energy access, but effective policy and financial mechanisms are required to expand their reach



Tap renewable energy

This is a must to ensure energy access and energy security **NAYANJYOTI GOSWAMI**

INDIA IS SUFFERING from acute energy poverty. Per capita electricity consumption of the country is one of the lowest in the world with 778 kiloWatt-hour (kWh) per year against the global average of 2,600 kWh per year. About 306 million people, mostly those in rural areas, do not have access to electricity. Worse, 818 million people depend on traditional biomass for cooking. In 2013, India ranked 136th on the human development index of UNDP.

Clearly, energy access issues need to be urgently addressed. While doing so India needs to be cautious as it is vulnerable to climate change impacts. At present, coal-based power generation is the largest source of carbon emissions in the country. These emissions will increase significantly if the growing number of coal-fired power stations are not checked.

The country's dependency on hydro carbon-based fuel is also increasing by the year. At present, it meets 30 per cent of the primary energy requirement through imports. The new government must strike a balance between energy security and its impact on health and climate.

1. The government must achieve the goals of Rural Electrification Policy and provide at least one unit of electricity per day to every rural household by 2019. Renewable energy-based mini-grids have emerged as the solution for energy

access. They must be promoted through effective policy and financial mechanisms. The government must also provide clean cooking fuel in rural India through LPG cylinders, piped biogas or improved cookstoves.

2. India needs to harness the full potential of renewable sources. The government must frame policies so that the share of renewable energy increases from marginal to mainstream in the total energy mix. The 12th Plan allocates ₹10,94,938 crore for the energy sector, of which 3 per cent is for renewable energy. This should increase to 25 per cent.

3. According to the Ministry of Power, about 25,000 MW can be saved through efficient use of energy. This can also help reduce the demand-supply gap by minimal investment. The new government should ensure that energy efficiency is embedded in all kinds of energy uses.

4. Current energy policies are fragmented and handled by five separate ministries. The government must consolidate these policies and bring coherence among ministries by instituting an umbrella organisation that will have a holistic view of India's energy mix model.

5. Even renewable energy can be detrimental to the environment if adequate measures are not taken. The new government must ensure that the environment is protected. ■

India must choose its energy carefully because it is vulnerable to climate change impacts

“ It’s not only the funding that mattered. The mentoring and guidance that came along with it was far more valuable for us as a start-up. We were pushed to perform at every step.”



Parveez Ubed, ERC Eyecare

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Ankur Capital is a social venture fund that invests in start-up businesses that impact low - income communities in India.



Villgro is one of India’s oldest and foremost social enterprise incubators, supporting innovators and social entrepreneurs during their early stages of growth.



Ennovent helps accelerate innovations for sustainability in low income markets.



CIIE provides incubation, ecosystem development and academic initiatives.

Target delivery

Programmes for rural development are in place. Ensure they reach each of the intended beneficiaries

RICHARD MAHAPATRA

833

million

people are supposed to benefit from rural development programmes. But, according to government estimate, 50 per cent do not get the earmarked benefits

➤ **Game changers** like the rural job programme and the food security law are critical for rural communities. But targeting benefits and fixing leakages are the toughest challenges

Now is the time to take up a community-driven plan to use village assets like ponds to regenerate rural ecology and environment

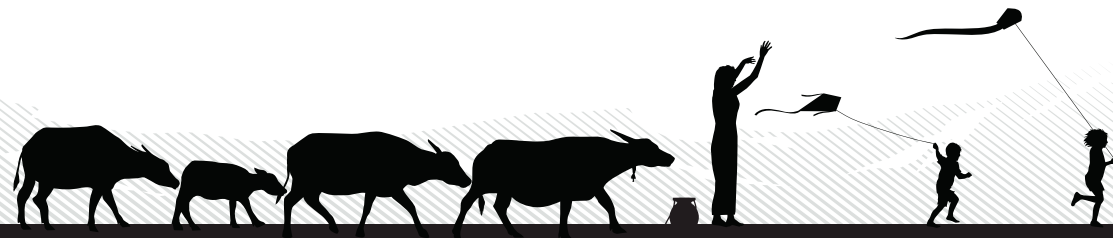
THE NEW GOVERNMENT has two tough challenges in the rural development sector. The first challenge is to match the United Progressive Alliance's (UPA's) rural development budget of more than one lakh crore rupees a year. The second is to fix the shortcomings in the delivery of development benefits to the right people. Deficiencies in delivery in many ways spelt the doom for UPA despite its unequivocal focus on rural budget. Prime Minister Narendra Modi, feted for his impeccable delivery skill, will be closely monitored on this agenda. The three steps he must take:

1. Retain the rural development budget. All recent government surveys point at the revival of rural consumption as well as overall economy. This is because of the enormous sums of money pumped into rural development in the last one decade. Rural growth is also helping national economy to grow at whatever slow pace it is growing. The new government should not downsize flagship programmes like the national rural employment scheme and the rural health mission that are directly linked to the well-being of the rural work force.

2. Reform the job programme. The new government should take up the much-needed reform in design and delivery of

rural development programmes. It should start with MGNREGA that is on decline. It should be revived as a core programme that provides a major source of funding for village development schemes. Villages already have millions of productive assets like ponds and tanks. Now is the time to take up a community-driven plan to use these assets to regenerate the village ecology and economy. Instead of the non-negotiable list of works under the Act, the government should mandatorily fund a village's plan to sustain the assets already built.

3. Decide on the direct benefit transfer. The buzz about sending the monetary value of development benefits directly to the accounts of the beneficiaries is fizzling out. This has more to do with the way India rolled out the ambitious programme. The government should first prepare a must-do list to make this programme successful. It needs a verifiable long-term commitment to expand the formal banking system to rural areas. Secondly, the system of identifying the beneficiary has to be clear and objective. To start with, the government must end the confusion over who is poor in India by quickly taking into account the findings of the recently finished caste and economic census. The purpose of the census was to gauge who is backward. ■



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trillion US \$ is going to be the economic impact of non-communicable diseases in India for 2012-2030. Similar estimates are not available for communicable diseases

- > **1.28 million** cases of tuberculosis and **1.06 million cases** of malaria were reported in 2012, according to World Health Statistics, 2014
- > **6.04%** of the 52 million people screened under National Programme for Prevention and Control of Cancer, Diabetes, CVD and Stroke were suspected to have diabetes; **5.32%** had hypertension
- > India has **7 physicians and 17.1 nurses** and midwives to serve a population of **10,000** against the global average of **14.1 and 29.2**



Develop with care

Economic growth is possible only if people are healthy. Disease prevention should, therefore, be the mantra of development **VIBHA VARSHNEY**

MODI'S MANTRA of development was crucial in the victory of Bharatiya Janata Party in the 2014 Lok Sabha elections. But careless development could cost people their health. This significantly hampers economic growth.

The latest World Health Statistics released by the World Health Organization show that for every 100,000 people, India lost 13,613 years of life due to non-communicable diseases and 14,186 years of life due to communicable diseases in 2012. "Years of life lost" is a measure of premature death.

Many times, diseases kill people in the prime of their working lives. Economic impact of these deaths is high. A WHO estimate suggests that India could lose between \$23 billion and \$53 billion a year in national income due to deaths from heart diseases, strokes and diabetes between 2005 and 2015. There is no estimate for losses due to communicable diseases.

Despite the growing burden of diseases, the United Progressive Alliance government allocated a meagre 1.3 per cent of the GDP for healthcare in the 12th Plan. The new government will have to increase the budget. But it should not focus only on curative care. Prevention of diseases will, however, be a challenge for the government. For example, to prevent exposure to

chemicals in food products the government will have to check the use of colourants, artificial sweeteners and trans fats. This will significantly affect the food industry, which uses the additives to lure customers. Similarly, to protect people from harmful impacts of particulate matter pollution

in the air, the government will have to limit private cars and promote public transport that run on clean fuel.

Healthcare has been one of the most neglected aspects of governance in India since Independence.

As BJP starts its innings at the Centre, it must heed a few words of advice.

1. Invest in health. Estimates show total healthcare expenditure by the Indians is 3.9 per cent of the GDP. Most of it is borne by the sick. This often pushes people to poverty. To ensure healthcare for all, the government must spend at least 5 per cent of the GDP.

2. Prevention is crucial. So the government must ensure access to safe water, air, food and areas for physical activity.

3. Give priority to health impacts during the environmental impact assessment of projects. Polluting industries should be allowed only if they adopt adequate environment protection measures.

4. Improve public healthcare services. If development can reach rural areas, so can healthcare. ■

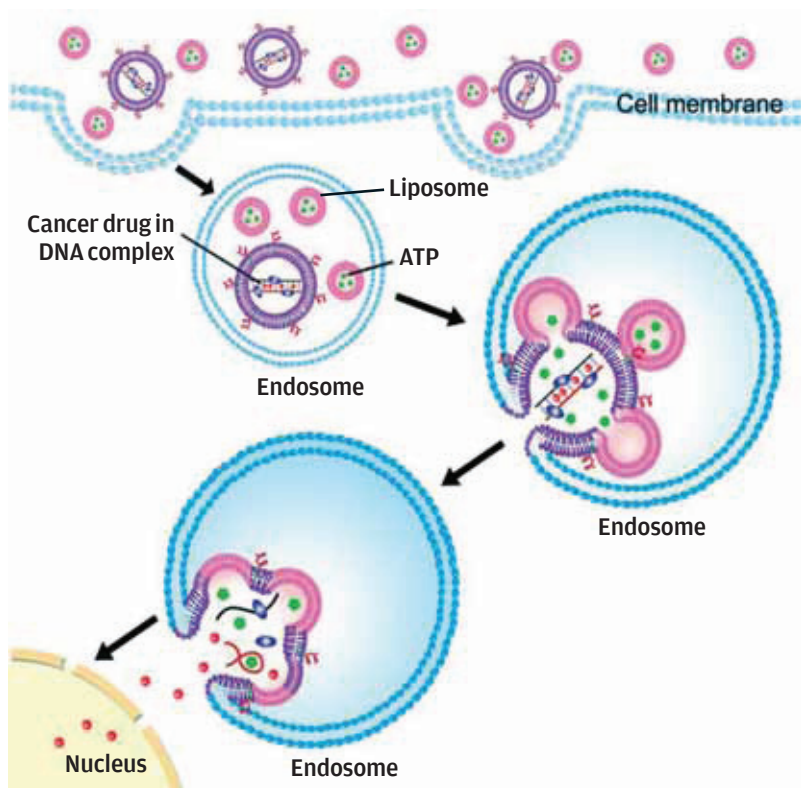
Diseases make people infirm or kill them in the prime of their working lives. This hampers economic growth



DNA cage for drugs

DNA complexes can help deliver cancer drugs only to affected cells

HEALTH



CANCER TREATMENT has serious side-effects because drugs, apart from attacking cancerous tissues, also expose non-target tissues to chemicals. To overcome this problem, researchers often look for methods to deliver the drug only to the affected areas. Now, liposomes, artificially prepared structures having lipid bilayers around them, are being tested for this. The therapy uses two sets of liposomes, one containing adenosine-5-triphosphate (ATP, or the energy molecule) and the other containing an anti-cancer drug embedded in a complex of DNA. The liposomes target the cancerous cells. Once absorbed into a cancer cell, the liposomes are sealed off from the rest of the cell in a special structure called endosome. In the acidic environment inside the endosome, the two types of liposomes fuse together and with the wall of the endosome. When the DNA molecules come into contact with ATP, they unfold using the energy from ATP and release the drug from its DNA cage in the cell, killing it. *Angewandte Chemie*, April 24

BIOLOGY

Test nails endocrine disruptors

THE RISE in infertility cases across the world has often been linked to chemicals used in everyday items such as textiles, drugs, food and personal-care products. But efforts to regulate the use of such chemicals, which disrupt the functioning of the endocrine gland, are hampered by lack of test to prove their deleterious effects. A new test shows that many of the chemicals adversely affect CatSper ion channel, a calcium channel in the sperm which controls its motility. Endocrine disruptors open CatSper, increase calcium levels in sperms and change their swimming behaviour. *EMBOreports*, May 12

AGRICULTURE



Yield booster

BLUEBERRY FARMERS can achieve better yields just by ensuring that the plant gets visited by different bee species. In North Carolina, US, it was found that exposure to each additional bee species resulted in an increase of \$311 worth of yield per acre (or 0.4 hectare). The benefit for each species was calculated to be \$1.42 million worth of additional yield a year in the state. Bees can be attracted by planting native, flowering plants near blueberry fields. *PLoS ONE*, May 9

ECOLOGY

Marine food web under threat

PHYTOPLANKTONS and zooplanktons are important parts of the marine food web. But rising ocean temperature is likely to reduce these food sources by 6 per cent and 11 per cent respectively by the end of the century. Rising water temperature may affect nutrient availability for these organisms. The impact would be more in tropical oceans, which cover 47 per cent of the global ocean surface. *Global Change Biology Journal*, May 7

TKM AFFORESTATION

A journey towards Green..!

Toyota Kirloskar Motor has focused on achieving harmony between its manufacturing activities and the natural world based on the concept of 'A plant that optimally utilizes natural resources, while operating in harmony with the natural environment.'



TKM being an affiliate of Toyota Motor Corporation, Japan works in line with the Environment Earth Charter that serves as a guideline for promoting & achieving environment targets. Apart from this, the Environment Five year Action Plan helps each affiliate to set targets to enhance its environment performance.

As its first step towards establishing a sustainable plant, TKM initiated Afforestation activity in

the year 2009 with the objectives of conservation of native ecosystem and also to spark the Eco conscious among team members and all the stakeholders. Our aim was to address the challenge, that our forests are facing today and provide a favorable habitat for the growth of native species.

The entire initiative is based on the 'Dr. Miyawaki Method' to restore and reconstruct forests based on the concept of "Potential Natural Vegetation", which helps in creating a fast growing Natural Forest at the rate of 1m/1 year by planting native species so as to create biodiversity and ecology.

A bird's eye view of the huge gathering on the Afforestation Day



OUR FIRST STEP TOWARDS BUILDING A GREEN TKM....

21st June 2009



21st Oct 2013



21st June 2009 was a unique milestone for TKM, in its journey towards creating an Eco-friendly company. The dream of afforestation turned real when 5800 people including team members came forward to support TKM. TKM also involved family members, suppliers and dealers, school children, neighboring industries, local community in this noble cause. By the combined efforts of the participants, within a short span of two hours, 32,500 saplings were planted.

CONTINUING OUR EFFORTS TO CREATE A GREEN COMPANY...

Despite a dip in the annual profits, TKM continued its afforestation programme. Voluntary afforestation activities were con-



Participants from all age groups (4 – 60 yrs) enthusiastically involved during the Event

ducted within the company premises. About 600 team members enthusiastically participated in voluntary afforestation programmes between April 2010 – March 2011. During the year 2011 around 67000 saplings were planted inside TKM. During the celebration of World Environment Month 2012, Team member volunteers planted more than 7500 saplings in schools & villages. The company has also been promoting to its business partners.

WORLD FOREST DAY CELEBRATION :

World Forest Day is celebrated worldwide every year on 21st of March in order to increase the public awareness among communities about the values, significance and contributions of the forests to balance the life cycle on the earth. More than 1250 members participated and planted 15000 saplings inside TKM premises.

Sandalwood Avenue has been created in the plant premise by planting about 200 saplings. As part of this event, using the non production hour's team members planted about 15000 numbers of saplings.

ECO CSR: AN ECO INITIATIVE AT COMMUNITIES

TKM is committed to environment protection and strongly believes in community involvement and public participation

to develop a sense of responsibility and affinity towards the environment. A Need based Assessment Survey was conducted to understand the Environment needs of community. Under this Team Members took up activities such as environmental awareness campaigns, waste management and plantation activities in the neighbouring villages & schools. Throughout this journey TKM has planted more than 2,42,000 saplings with 70 different native species that has resulted in development of 52 acres of green belt area. In future, these can be utilised as reproduction orchards and also as research sites.

Eco initiative at communities





Unaware and unprepared

More than 26 asteroids entered Earth's atmosphere between 2000 and 2013. None of them was detected in advance

SOMA BASU

THE CHANCES OF a “city-killing” asteroid striking Earth are much higher than scientists previously thought. A recent report has found that more than 26 asteroids reached Earth's atmosphere between 2000 and 2013—a number much higher than estimated. The findings released by the Nuclear Test Ban Treaty Organization on April 24, 2014 suggest that some of the asteroid explosions were more intense than the nuclear explosion that wiped out Hiroshima in 1945.

The report says that while most of these asteroids exploded too high in the atmosphere to cause serious damage, the one that fell in Chelyabinsk, Russia, in February last year damaged hundreds of buildings and injured more than 1,600 people. The report points out that none of the 26 asteroid impacts was detected in advance, suggesting the need for a better mechanism to warn of asteroids approaching Earth.

The urgency to develop such a mechanism is growing by the day. “Since we don't know where or when the next major impact will occur, and because none of these 26 asteroid explosions was detected in advance, it means the only thing preventing a catastrophe from a ‘city-killer’ asteroid is blind luck,” says Ed Lu, CEO and co-founder of the B612 Foundation, a private body dedicated to protect Earth from asteroids.

The B612 Foundation has partnered

“Since we don't know where or when the next asteroid impact will occur, the only thing preventing a catastrophe is blind luck”

— Ed Lu, CEO of B612 Foundation

Chunk of the asteroid that exploded over Russia on February 15, 2013. The explosion had injured over 1,600 people



REUTERS

with Ball Aerospace, an American spacecraft manufacturer, to build the Sentinel Infrared Space Telescope Mission. The Sentinel Mission will place a telescope in an oblong Venus-like trajectory to orbit Earth.

An asteroid approaching the atmosphere can be deflected by either changing its course by an impact on its surface by a spacecraft, or by transporting the asteroid to an orbit around Earth using an aircraft. The asteroid can also be hit with a nuclear bomb, but such an explosion is banned under the UN peace treaty.

“You cannot deflect an asteroid you don't even know is headed to Earth,” says B612 co-founder and chair emeritus Rusty Schweickart, who flew on the Apollo 9 mission in 1969. The goal of the B612 mission is to locate asteroids before they come near Earth so that scientists have enough time to prepare a deflection mission. The project is expected to be launched in 2017.

Besides the private initiative, several governmental agencies are also looking for options to identify asteroids and deflect them. In October 2013, the UN passed a resolution calling for the establishment of an International Asteroid Warning Group

that would monitor potentially destructive extraterrestrial objects. The decision was taken after the Association of Space Explorers published a report stating the need for international cooperation on the issue.

NASA, on its part, has announced an Asteroid Grand Challenge in which it has invited government agencies and scientists to locate asteroids so that they can be analysed for the threat they pose to the planet. NASA is also planning to launch the Asteroid Redirect Mission that will use robots to capture and redirect potentially hazardous asteroids to a stable orbit around the moon.

The Organisation for Economic Co-operation and Development (OECD) is also planning to set up a forum and find technologies that may be used to detect asteroids in a better way. India is a member of the OECD.

Even the European Union is running a project to brace against asteroid collisions. The mission is called NEOSHIELD (Near Earth Object shield) and it partners with various European universities and research centres.

Asteroids, big and small, will continue to move towards Earth and Lu believes that unless the detection mechanism is strengthened, one will eventually hit us. ■



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IN 2009 WHEN the Union Ministry of Environment and Forests (MOEF) decided to get new office space for its 600-odd officials, the then minister Jairam Ramesh envisaged it to be a trendsetter in environment-friendly buildings in the country. Christened Indira Paryavaran Bhawan (IPB), the swanky office building underwent multiple delays and massive cost overrun before it was hurriedly inaugurated by former prime minister Manmohan Singh in February—a month ahead of the Election Commission's announcement of the 2014 general elections. But IPB has not quite caught the attention of the nation as Ramesh had expected. Although it has set a precedent in rooftop solar power generation, it fails to address the larger issues of resource efficiency and affordability, which are the key features of an eco-friendly building.

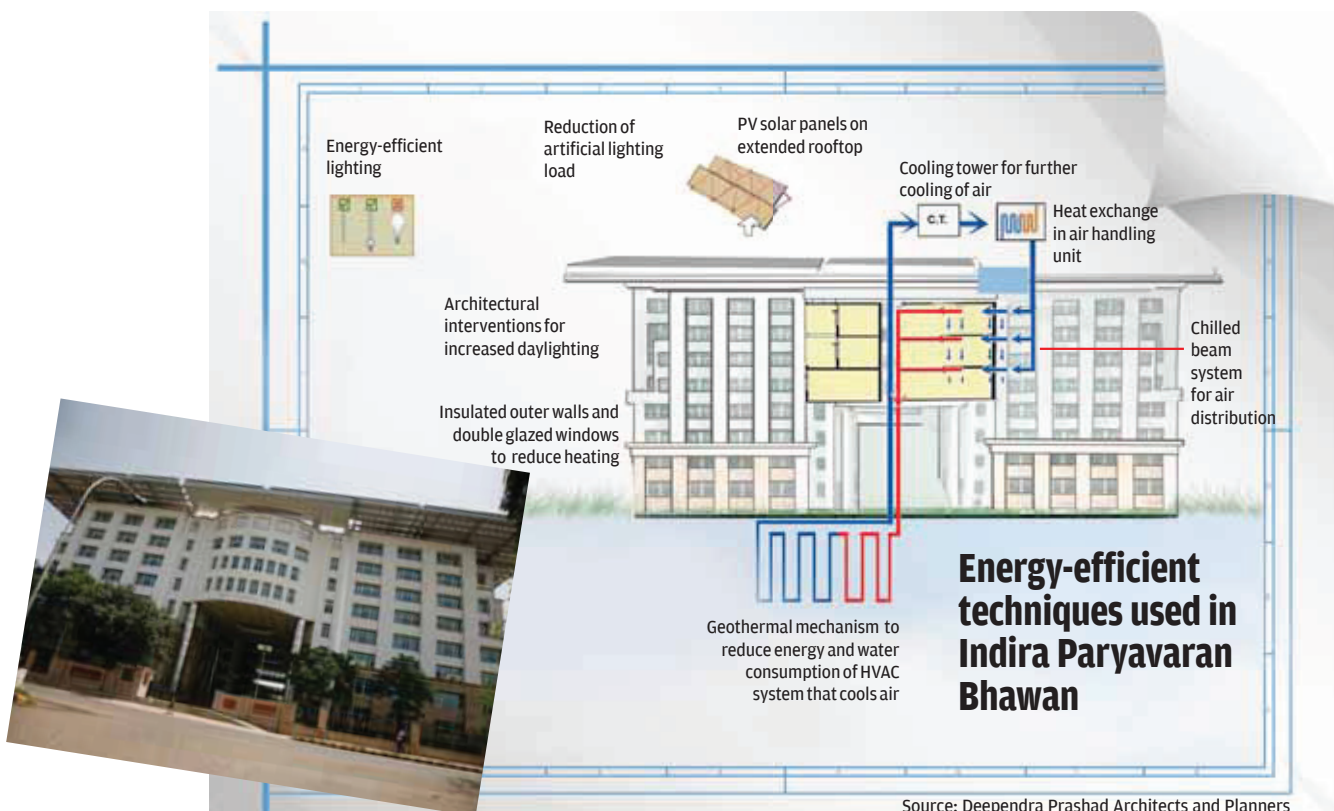
But before analysing its efficiency, let's first understand how the building manages its energy requirement. In a typical commercial building, 80 per cent of the energy used goes to lighting and heating, ventilation and

Energy wise, resource foolish

Most eco-friendly claims of Indira Paryavaran Bhawan are hogwash

AVIKAL SOMVANSHI

air-conditioning (HVAC). IPB employs a mix of architectural interventions with super-efficient technologies to reduce these energy loads. To reduce exposure to direct heat, the building has east-west orientation and its outer walls are padded with heat reflecting terrace tiles and rock wool for insulation. Glazing, or wall to window ratio, is restricted to 17 per cent. Windows are fitted with double-glazed units that allow natural illumination, not heat. To reduce dependence on air-conditioning, the building has open atrium and lobbies. Only 38 per cent of the building is air-conditioned by using advanced HVAC technology (this includes screw chillers, variable frequency drives and chilled beams). This HVAC system consumes two-thirds less energy. MOEF went against the comfort standards of National Building Code (NBC), which is 23°C-26°C for summer and 21°C-23°C for winter, and fixed the setpoint temperature of HVAC at 26±1°C for summer and 19±1°C for winter. Studies show that every degree rise or drop in setpoint temperature saves 3-5 per cent of energy.



Energy-efficient techniques used in Indira Paryavaran Bhawan

To save energy spent on lighting, 75 per cent of the office space is designed to be daylight. Further, interiors are designed in a way that every square metre can be illuminated by 5Watt, instead of the standard 11Watt. Energy efficient lighting systems and lux-level sensors (that optimise operation of lighting by sensing presence of people and daylight in the room) further help reduce energy use. Since office appliances account for 20 per cent of the energy consumed, IPB uses only the ones rated Five-Star (most energy efficient) by the Bureau of Energy Efficiency (BEE). "IPB's energy consumption will remain within projection only if officials do not use personal printers, fax and coffee machines," warns Deependra Prashad, independent green building consultant for IPB.

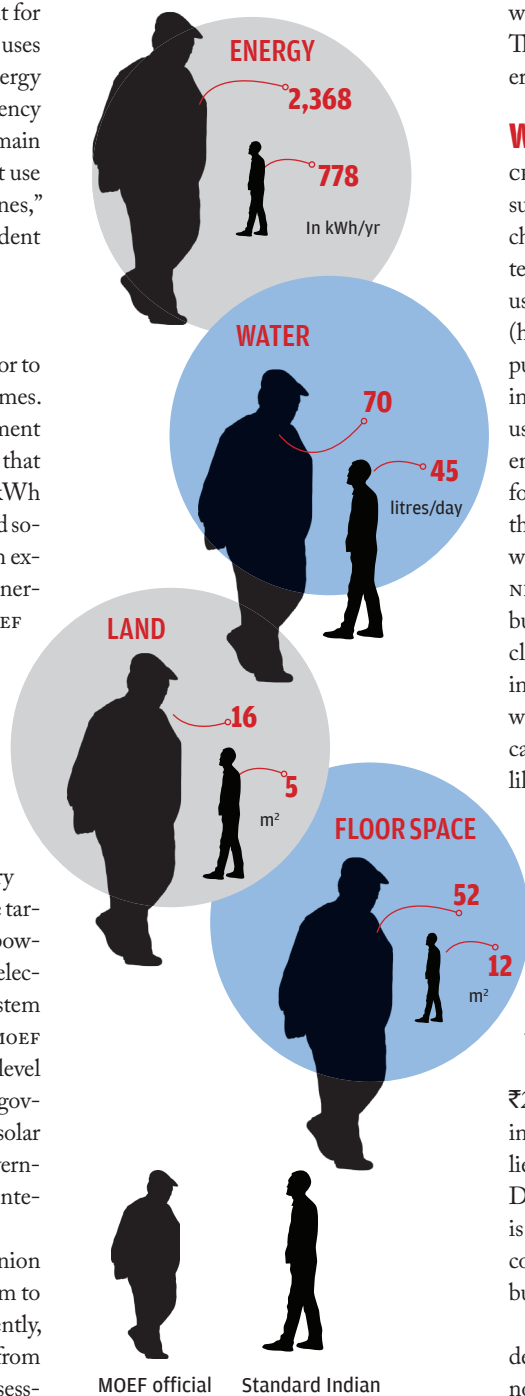
Mission net-zero

The goal of IPB is to be energy net-zero, or to generate as much electricity as it consumes. The Central Public Works Department (CPWD), which has designed IPB, claims that the building may consume 1.42 million kWh a year. To become net-zero, it has installed solar photovoltaic panels on its 6,000 sq m extended rooftop, which is expected to generate 1.49 million kWh a year. Though MOEF is yet to move into the building, IPB has generated 0.22 million kWh between November 2013 and February 2014. IPB does not directly use the solar energy it generates. It feeds the energy into the grid and uses grid electricity. This is to avoid storing solar energy that requires hazardous and expensive battery banks and massive floor space. Since the tariff at which the government buys solar power is higher than the rate at which it sells electricity for commercial use, IPB's solar system will pay for itself and make money for MOEF in near future. "IPB is the first building-level renewable project selling energy to the government. It demonstrates that rooftop solar is profitable," says Prashad. "The new government may upgrade the national grid to integrate more such projects."

But green building is a bigger dominion than rooftop solar, and IPB does not seem to be efficient in resource utilisation. Recently, IPB received a provisional Five-Star from Green Rating for Integrated Habitat Assess-

How green is MoEF's new office?

Down To Earth compares resources to be used by an official at Indira Paryavan Bhawan with standards set for average Indian



ment (GRIHA), which says IPB's energy performance index (EPI) is 39.28 kWh/sqm/year. But GRIHA does not consider energy used by appliances. While GRIHA is conceived by Delhi non-profit Tata Energy Research Institute, BEE has its own set of standards for rating buildings. *Down To Earth* has learned that going by BEE standard, EPI of IPB will be 67 kWh/sqm/year, which warrants a unimpressive Two-Star. This further suggests that the building is energy inefficient.

Where else it falters

CPWD claims to have reduced IPB's water consumption to 50 per cent by using low discharge water fixtures, plants that use less water in landscaping, recycling wastewater and using geothermal mechanism for cooling (hot water coming out of HVAC system is pumped into a network of pipes placed deep inside the earth. The cooled water is then re-used in the HVAC system). According to IPB's environment impact assessment, its water footprint is 42 kilo litres a day. A back-of-the-envelope calculation shows the building will consume 70 litres per capita daily (lpcd). NBC's water consumption standard for office building is 45 lpcd on an average. There is no clarity on IPB's claims of rainwater harvesting. MOEF says IPB cannot recharge groundwater as water table in the area is high. In that case IPB could have a rainwater storage tank like other buildings in the area.

Despite a Metro station 300 metres away, IPB has a three-storey energy-intensive robotic stacked parking in the basement to accommodate 344 cars. This is against the grain of sustainable mobility. Parking acts as a magnet for traffic while the need of the day is to restrict private vehicles to promote public transport.

IPB has been built at an expense of ₹201 crore. This is 54 per cent above MOEF's initial estimate for IPB and 82 per cent costlier than the new office of Haryana Energy Development Agency in Panchkula, which is also a GRIHA Five-Star. Such exorbitant cost of IPB only adds to the myth that green buildings are expensive.

Green buildings are expected to be prudent and efficient with resource utilisation, not just energy generation. ■

Treasuring Rains



Water scarcity still remains a stark reality in many parts of our country. In India, villages on and around the coastline are affected by soil salinity, which impacts the life of the villagers in a major way. Livelihoods are affected as farming takes a toll since fresh water for irrigation is not easily available. One of the most effective ways of water conservation is rain water harvesting; it brings about a change in the water quality, recharges ground water and ensures fresh water sufficiency.

WHO estimates that water scarcity affects one in three people in the world. Increasing population growth has resulted in increased demands on our natural resources. In surrounding nine villages of Essar Oil refinery in Jamnagar and Devbhoomi Dwarka districts of Gujarat, few kilometres from the coast, farmers bear a proud look, seeing their crops grow healthy after more than a decade of failures.

Initiated in early 2013, Essar Foundation's water resource development project is based on a rigorous assessment study conducted by BAIF, technical partner for the project. In the first phase, project work has been carried out in the villages of Jhakhar, Singach and Vadinar. The project aims to harvest rain water in watershed structures and make fresh water available in the villages for agriculture and drinking.

The water resource development project initiated by Essar Foundation has successfully improved the quality of life in the villages in coastal Gujarat by harnessing the power of rain water to recharge ground water and improve water quality.

Instilling New Lease of Life

Under the project, new water harvesting structures were created and existing structures repaired. Tasks like pond deepening, repairing of existing dams, creating check dams, nala plugging, well recharge structures, farm ponds, and creation of percolation tanks were undertaken to provide fresh drinking water round the year.

For instance, a 30-year old dam in Jhakhar village constructed originally to collect rain water and to check the ingress of sea water was in great disrepair. Sea water mixed with rain water, making it saline and affecting agricultural productivity. After consulting with the villagers, Essar Foundation filled the gaps and leakages and now the old dam is a reservoir of fresh rain water. The Foundation also constructed a new pond at Vadinar and deepened an existing pond at Singach village.

For Bhikubha Jadeja of Vadinar village, these activities have been most opportune. His four hectares of land, where he grows Bt cotton has benefited enormously by the project. Ground water level has gone up in the wells on his land by about 70 feet immediately after rainwater began filling the pond. There has also been a significant improvement in the quality of water.

“ With oncoming monsoons, this project will resolve all the problems we have ever had with salinity.” - Bhikubha Jadeja of Vadinar Village, Gujarat

Ensuring adequate availability of potable and safe drinking water is one of the key thrust areas of Essar Foundation. Communities in some of the most geographically challenging locations like Chitrakonda, Odisha, Tori, Jharkhand and Mahan, Madhya Pradesh are continuing to benefit from the initiatives of water neutralization and safe drinking water supply.

Name of Village	No. of Families Benefitting Directly	No. of Families Benefitting Indirectly	Total
Jhakhar	150	580	730
Singach	65	85	150
Vadinar	38	150	188
Total	253	815	1068



Delivering on Potential

Gujarat Rural Institute for Socio-economic Reconstruction Vadodara (GRISERV) conducted an impact study of the project in the villages.

Impact of Renovation/Reclamation of old water harvesting structures

Particulars	Previous situation	Post-intervention Impact
Water harvesting structure	Old, damaged structure	Renovation of damaged structure and application of soil by trench method to avoid intrusion of sea water.
Water quality	Water was not useful for drinking, agriculture purpose due to sea water and refinery chemical intrusion in ground water.	Standing fresh water in the pond and reclamation of structure prohibits the intrusion of sea water and chemical into pond.
Water availability	Limited water availability in the wells.	Water level in the wells is increasing gradually.
Cropping pattern	Kharif: Cotton, Rabi: Groundnut Summer: Watermelon (very poor harvest)	Kharif: Cotton Rabi: Wheat, Groundnut, Vegetables Summer: Watermelon (abundant)



About 70 farmers and their families depending on 100 ha land directly benefited due to reclamation work due to good quality of water. Water table in the surrounding about 50 wells is gradually increasing. Drudgery among women is reduced significantly in fetching potable water. Fresh potable water for domestic animals of the village is now abundantly available.

Minimum 25 % land under irrigation is increased due to sufficient water availability for irrigation. Fresh water retention in the pond facilitates ground water recharge which results in improvement in ground water level. Similarly, from other such interventions in surrounding villages sufficient water availability has allowed farmers to start cultivation of second crop wheat in Rabi season.

Essar Foundation's efforts at harvesting rain water and conserving this precious natural resource is a welcome gesture, especially during times of unpredictable rain and water scarcity. With subsequent monsoon cycles, the structures will recharge more ground water and will positively affect the ecology and water quality more significantly. With a growing water table and healthy cropland, the project has notched several successes and is geared to expand its footprint in the coming years. Who would stand better testimony to this than the families of those farmers who have been able to reap a healthy harvest after years of dry spells!



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Fruity twist to grandma's tale

The country fig can pass off as any other wild fruit. Little can one guess it has a cluster of fibrous flowers inside, loaded with prebiotic properties **SANGEETA KHANNA**



PHOTOGRAPHS: SANGEETA KHANNA

Goolar ka chokha is a delicious remedy for an upset stomach

REMEMBER MY grandmother telling me bedtime stories when I was a child. Her tales of animals, birds, trees and forests took me to unknown lands of fantasy. One of the stories that has stayed with me was called *Goolar ke phool*. The story was about *goolar* (fig) flowers which were seen by only lucky people, and whoever was able to see them would find a treasure or a lost kingdom. Excited at the prospect of coming across a hidden treasure, I would often look curiously at the wild fig trees along the roadsides in the hope of finding the flowers.

Small wonder I never got lucky. I came to know later in school that the small figs I saw on the trees were actually flowers which I mistook for fruits. I learnt in my biology class much later that the fig is an inflorescence (cluster of flowers) called syconium. This is an urn-shaped structure with the flowers hidden inside. The receptacle is fleshy, which makes fig a pseudo fruit. The flowers are pollinated by small insects that crawl in through tiny openings in the cup. By the time a fig is ripe, the insects complete their life cycle—a perfect example of symbiosis between flowers and insects.

People in India consider the fig tree sacred and it is often planted around houses and temples. They are also planted as shade trees in coffee plantations in south India. Interestingly, fig was never cultivated in the country. It was foraged during the harsh summer months and at the beginning of monsoon when green vegetables were scarce. Vendors who sold the fruit in the market had to collect it from the jungles or roadsides. Figs are a favourite of macaques, squirrels and most birds, particularly barbets, tree pies and parakeets. Thanks to the dispersal of seeds by animals, fig grows in the wild all over the country.

Scientifically called *Ficus racemosa*, the Indian fig tree is a relative of banyan and is popularly known as cluster fig or country fig. The fruit is called *anjeer* in Urdu. The name is popular in Hindi as well. Bengalis better know it as *dumur*. Although *goolar* and *anjeer* refer to the same fruit, the names are nowadays used for two different varieties,

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While *goolar* is abundantly available in the wild, *anjeer* (extreme right) is sold in the market at a high price



probably depending on the place of origin. *Goolar* (*Ficus racemosa*) is the local variety which grows in the wild. It is small in size and mildly sweet when ripe. Figs that are imported from Persia, Iran and Afghanistan are known by the Persian name *anjeer* (*Ficus carica*). This variety is larger and sweet when ripe. The Persian fig is preferred for its taste and attractiveness—it is fleshy and has a deep purple colour. Today these are sold in India in upmarket stores at a premium price. For the past few years, a hybrid variety of fig is being cultivated in Maharashtra by crossing the Indian *goolar* and the Persian *anjeer*. This variety is called Puna fig or *puneri anjeer*.

Goolar comes with a host of health benefits. It has cooling, purifying, healing and anti-inflammatory properties, according to Ayurveda. Science, too, validates these medicinal claims. A review published in the *International Journal of Pharmaceutical Sciences Review and Research* in 2010 shows that the fruit can help reduce cholesterol. The soluble and insoluble fibre in the fruit is prebiotic in nature, which helps maintain a healthy gut.

I have always associated *goolar* with my grandmother. She not only told me stories about this wonder fruit, but also knew how to use it to cure day-to-day ailments. Living up to a ripe old age of 105, she always turned to *goolar* when she had an upset stomach. She would mostly make *goolar ka chokha* (boiled and mashed fig with seasoning), al-

though she loved the spicy meaty curry cooked with it. During my days in Jharkhand, I learnt from the tribes there that the dehydrated and powdered raw *goolar* can be taken with sugar candy to treat *E. coli* infections.

Goolar ki sabzi has always been a family favourite. The last time I tasted this curry was a couple of years ago when I was visiting my home in Varanasi. I miss the delicacy here in Delhi. Although I had noticed a few *goolar* trees around my colony, I never took the pain to pluck the fruit myself. But last month I decided to try out a few recipes I learnt from my grandmother. I asked the gardener to bring me some figs from the nearby trees and he obliged. I cooked *chokha* and kabab and made pickle with the remaining figs.

To cook raw *goolar*, one has to cut the fruit in quarters, clean the interiors of all the floral parts and insects. The fleshy receptacle is parboiled and then either curried or mashed to make *bharta*, or *chokha*. Ripe figs of all varieties are highly perishable—they start softening very fast and rot within a couple of days.

Dehydrating can preserve them. The imported figs are dehydrated and called *sookhi anjeer*. This is an excellent remedy for constipation. Just soak it overnight and take it with milk the next day. The natural sweetness of *sookhi anjeer* is similar to that of raisins and currants; this makes it useful in flavouring sugar-free desserts such as *kulfi* and ice cream. ■

The writer is a food and nutrition consultant

RECIPE

Goolar ka chokha

INGREDIENTS

1 and a half cups *goolar*, cleaned and chopped
 1/4 cup finely diced onion
 1 tsp minced garlic
 1/2 tsp minced green chilly
 1 tsp mustard oil
 Salt to taste

METHOD

Boil the *goolar* in sufficient water till soft. Drain the water. Mash the *goolar* or blend in a blender. Mix with the other ingredients. Serve with *khichdi*, *daal* and rice or as a side dish to any Indian meal.

Goolar kabab

INGREDIENTS

1 cup *goolar*, cleaned and chopped
 2 tsp roasted chickpea flour or *sattu*
 1 tsp each of minced ginger, garlic and green chillies
 1 tsp garam masala
 1/2 cup chopped coriander and mint leaves
 Salt to taste
 Ghee to shallow fry

METHOD

Boil the *goolar* in sufficient water till soft, drain and let it cool. Mash with the other ingredients, except ghee, to make a dough-like mixture. Shape the dough into lime-sized balls and flatten them between the palms. Shallow fry in batches. Serve hot with tamarind or green chutney.

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COURTESY: ANA BIANCHI

Savage people

Human zoos were aids to anthropologists, scientists and racial theorists in 19th century

KAUSHIK DASGUPTA

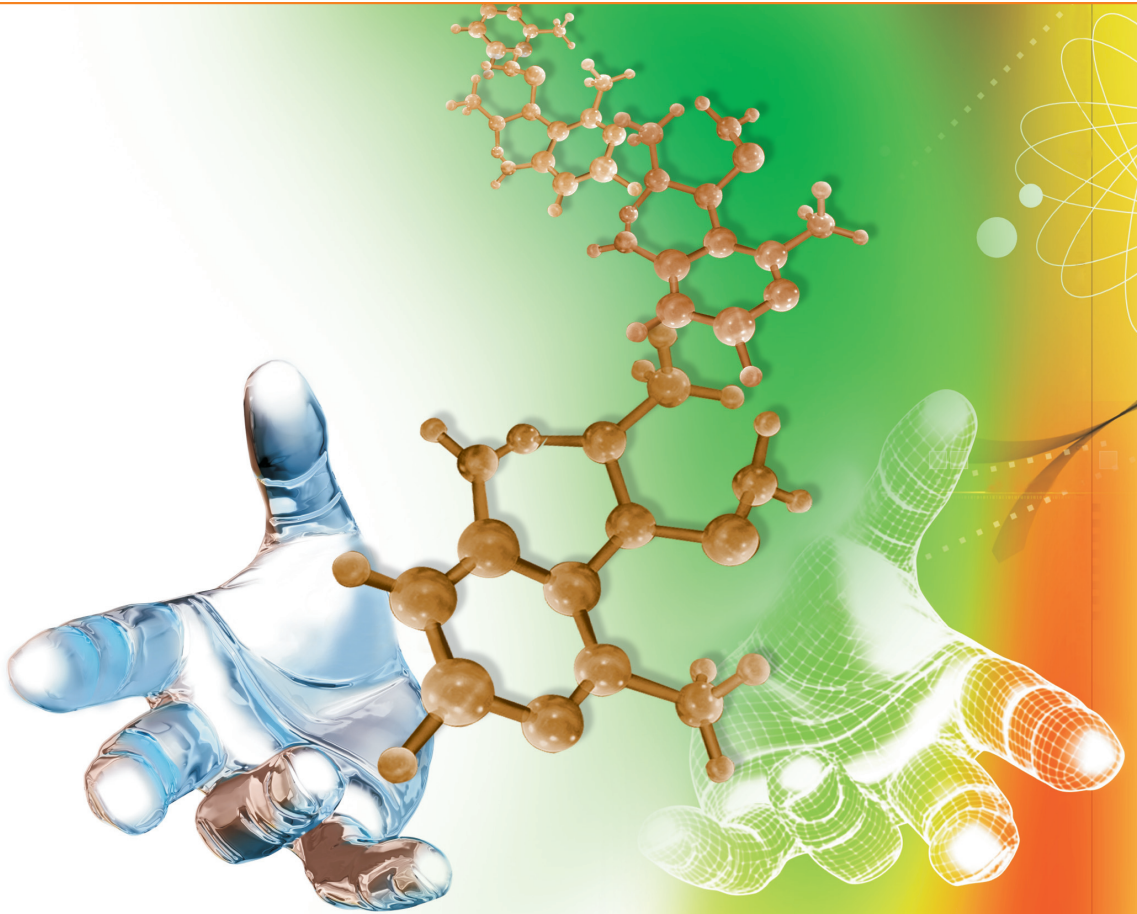
IN 1914, Norway celebrated the 100th year of its constitution with a fair in its capital, Oslo. Opened by Norwegian monarch Haakon VII, the fair's biggest draw was a human zoo. More than 1.5 million people gawked at 80 men, women and children brought from different parts of Africa and then confined to a thatched hut "village", Congo Village, for five months. *Urd*, a Norwegian magazine, concluded at the end of the exhibition, "It's wonderful that we are white".

Norway is re-staging Congo Village to celebrate its 200th anniversary. The project is the brainchild of artists Mohamed Ali Fadlali and Lars Cuzner, who say the ignorance around Norway's racist past inspired them to re-create the human zoo. Quite predictably, the re-enactment has attracted controversy. Rune Berglund Steen of the Norwegian Centre Against Racism initially described the project as "degrading". Steen later recanted, saying the exhibit could be positive. "But the Congo Village of 2014 won't stand as resounding answer to 1914, but as a very confusing echo."

The 1914 exhibition was part of a nearly century-old European

tradition. Says historian Pascal Blanchard, "The purpose of creating these human zoos was to create a clear divide between so-called superior and inferior human beings... Scientific claims got married to pop entertainment."

Venus Hottentot is an apt example. Born around 1790 in South Africa, she was enslaved by Dutch colonists when barely a teenager. Venus' captors re-named her Sarah Baartman and sold her to a Parisian animal trainer. The animal trainer fascinated by the young woman's physical features—including enormous hips and elongated labia typical of the Khoi people along the Gamtoos River—decided she was ideal exhibit for a public fascinated by the new "scientific study of race". Venus was turned over to the Museum of Natural History in London. On her death, she was examined by French anatomist Georges Cuvier, and her brain and sex organs were kept on display at the Parisian Musée de l'Homme until 1974. Following a request by Nelson Mandela that her remains be returned to her homeland in the Gamtoos Valley—and following fierce debate



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(Top) German animal trader Carl Hagenbeck's human zoo exhibiting Sudanese natives; (right) Ota Benga at Bronx zoo in New York



The story of Ota Benga

IN 1904, US missionary Phillips Verner was hired by St Louis World Fair to bring pygmies for its "ethnographic exhibition". One of the missionary's acquisition was Ota Benga, a Congolese. At St Louis, the crowds gawked and threw mud pies at the human exhibit.

Verner did take Benga back to Congo. But Benga expressed a desire to learn to read, prompting Verner to take him back to the US. On return Benga was sent to a New York Zoo, kept in an orangutan's cage and encouraged to play with the animal. Benga was making plans to free himself when World War I broke out. A return to Congo became impossible, and Benga became depressed. On March 20, 1916, at the age of 32, Ota Benga built a ceremonial fire and shot himself in the heart with a stolen pistol. The death certificate listed his name as Otto Bingo.

in the French National Assembly—what was left of "Venus Hottentot" was buried in 2002.

In August 1835, American circus magnate PT Barnum paid one RW Lindsay US \$1,000 for the rights to the story of Joice Heth. The story, Lindsay explained to Barnum, was that the elderly African-American woman was a slave owned by Augustine Washington (George Washington's father) and nursed the young George. With this story, Barnum paraded the blind and nearly paralysed Heth across New England advertising her as a 161-year-old woman who was "the greatest natural and national curiosity in the world". People thronged to touch the hands that held the baby George Washington. Heth died after seven months on Barnum's exhibition circuit. A public autopsy was organised to determine Heth's true age. Fifteen hundred viewers were charged \$0.50 each to watch a doctor dissect the old woman. She was found to be 75-80 years old. Barnum admitted he had been bamboozled by Lindsay into believing Heth's story.

Human zoos, however, came into being in the 1870s when German animal trader Carl Hagenbeck built on the incipient idea of ethnographic exhibits. At Hamburg's Tierpark Hagenbeck zoo—which Hagenbeck founded and which still carries his name—he exhibited Samoan and Sami people as "purely natural" populations. The Hamburg resident travelled to different parts of the world taking people captive for his zoo. According to Hans Mülchi, maker of documentary film *Human Zoo: The Story of Calafate*, Hagenbeck often received government support. The Chilean filmmaker says on an expedition to Chile, the German animal trader enlisted human exhibits for his tour, *The Savages from Tierra del Fuego*, which he took to Leipzig, Berlin, Monaco, Stuttgart, Nuremberg, Zurich and Paris.

In 1876, Hagenbeck sent a collaborator to Egyptian Sudan to bring back some wild beasts and Nubians. The Nubian exhibit toured

Paris, London and Berlin. It inspired Parisian naturalist Geoffroy de Saint-Hilaire to organise two "ethnological spectacles" in 1877 that presented Nubians and Inuit. That year, the audience at Jardin Zoologique D'acclimatation—an amusement park in Paris, which de Saint-Hilaire headed—doubled to one million. Between 1877 and 1912, Jardin held about 30 "ethnological exhibitions".

The "ethnological exhibitions" were progenitors of a series of human zoos in France. According to Blanchard, "Men and women from the colonies were lured into joining paid troupes that toured international exhibitions from Marseille to New York, where they were exploited by agents and colonial administrators." The Colonial Exhibitions in Marseilles (1906 and 1922) and in Paris (1907 and 1931) displayed humans in cages, often nude or semi-nude. Nearly 34 million people attended the six-month-long Colonial Exhibition in 1931. In contrast, a counter-exhibition, *The Truth on the Colonies*, organised by French Communist Party, attracted few visitors.

Says Blanchard, "For the visitors, going to Colonial Exhibitions was akin to going to circus, with exotic freak shows on offer for a couple of francs." French art historian Isabelle Levêque says, "Postcards show women gushing over African babies and men ogling bare-breasted African women." Degraded living conditions, diseases and low temperatures meant that many died on tour. "At Jardin Zoologique D'acclimatation, many human exhibits died on show and were buried in the garden," says Blanchard. The historian writes that scientists and anthropologists grabbed this opportunity to study the families on display and collect data for their work, much of which contributed to the racial theories of the period.

By the 1930s, human zoos were under criticism for their blatant racism and ethnographic displays were on the wane. However, the Brussels World's Fair held in 1958 kept a Congolese village on display. Even as late as 1994, an Ivory Coast village was kept as part of an African safari in Port-Saint-Père, near Nantes, France. In 2005, London Zoo displayed humans wearing fig leaves, while in 2007 Adelaide Zoo housed people in a former ape enclosure. They were, of course, allowed to return home at night, unlike many of the earlier incarnations of these racist displays. ■

Anthropologists studied families on display at "ethnological exhibitions" and collected data for their work, much of which contributed to racial theories of the period

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WHAT AILS THE JARAWA PEOPLE IN THE ANDAMANS?

Contact with the outside world has exposed the Jarawas to various dangers. Is isolation the best way to conserve?



DENIS GILES
is the Editor of
Andaman Chronicles

"Administration created the malaise"

— Denis Giles

NUMBERING around 400, people of the Jarawa tribe occupy the lion's share of land in South and Middle Andaman Islands, earmarked as Jarawa Tribal Reserve (JTR). This irks leaders of political parties and businesspeople, who often question the need for such a huge stretch of land for a handful of Jarawas. They also suggest and offer welfare measures for

the Jarawas, not willing to realise the consequences these may have on the tribe. The Andaman Chamber of Commerce has offered to construct houses for the tribe. Political leaders such as Bishnu Pada Ray, lone member of Parliament from the Andaman and Nicobar parliamentary constituency, have even argued that "given a chance the Jarawa can scale political heights like Barrack Obama, who belongs to a tribal community".

Suggestions and arguments will be offered ad infinitum but it is clear that the outside world is more focused on the land occupied by the tribe than on welfare of the 400-odd Jarawas. As settlers in an alien land, we have already destroyed what we had snatched from the aborigines in the name of development. As a result we deal with scarcity every day. Today if there is land to accommodate the exploding population of settlers and water to quench the thirst of 200,000 settlers in South Andaman, it

Outside world is more focused on the land occupied by the tribe than on welfare of the 400-odd Jarawas

remains inside the Jarawa home.

The Andaman Adim Janjati Vikas Samiti (AAJVS), an NGO run by the Andaman Administration, has been given the responsibility to look after the welfare of aborigines in Andaman and Nicobar Islands. The Jarawa Protection Police has been posted around the reserve to check poaching and other illegal activities inside the JTR. Reports now indicate that the exploitation of the Jarawas is not confined to poaching, but people of the tribe are being sexually exploited and introduced to drugs.

The world's attention has rightly been drawn to the Andaman Trunk Road (ATR) that divides the Jarawa home into two halves. But we had not realised that exploitation is in full swing at

the fringes of the JTR. It needed the media to expose the bitter truth, the consequence of which was the administration chasing the messengers instead of following the message. Was the Andaman administration really unaware of the exploitation?

When the process to accommodate refugees from the erstwhile East Pakistan began, the Jarawas reacted with hostility. Perhaps justifiably, for we were snatching away their land and resources. But now when the Jarawas are no longer hostile, the settlers have become aggressive. It all started in 2007 when the then Administrator of Andaman and Nicobar Islands demarcated a buffer zone that extended deep inside the settlement villages in the name of protecting the Jarawa tribe. The concept of a buffer zone was proposed in a master plan prepared in the late 1990s. But it suggested a 500 m buffer zone. The buffer zone created in 2007 stretched to 5 km on land and 10 km in the sea from the high tide level. This led to closure of many resorts and the value of land in the settlement areas dropped steadily. To add to the commotion, political leaders advocated that the settlers be removed from their land to protect the Jarawa tribe. Was there a need to create a 5 km buffer zone? Why did the Administration never make serious attempts to sensitise settlers on the need to protect the vulnerable tribe? Why were there no attempts to fix loopholes in the law that let poachers and exploiters go scot free in spite of being held for the crimes?

If we wish to empower the Jarawas by educating them about the outside world, it should be done in their own language and in their own way. No one can stop the development process. The

Jarawas have learnt Hindi and other Indian languages. The welfare staff have learnt the Jarawa language too. It is time we thought of some serious study on the Jarawas, learning and recording of their language, culture and medicinal practices.

"Jarawas want to integrate"

— Mohan Halder

OUR FOREFATHERS, Bengali refugees of Partition, were settled in Andaman islands in 1949. There were deep forests. We were asked to clear them and make the land cultivable. The reclaimed land was allotted to us. We began with fruit, vegetable and foodgrain production. Later, betel nut and coconut production went up in a major way.

After the buffer zone was notified, all commercial activities stopped and banks stopped financial assistance. In Colinpur village, a resort named Barefoot was closed. Several of our village youths had found work there.

The land value has decreased by a third after the notification. Small shops are running as usual inside the buffer zone, but big businesses with turnover running into crores of rupees and employing more than 20 people are not allowed. We have lost the opportunity that tourism could have provided us.

My grandparents told me that initially, Jarawas used to run away on seeing the settlers. Later, they

If Jarawas are brought into the mainstream they will not die out as is portrayed internationally

started attacking us with arrows. Then the administration tried to befriend the Jarawas: they were offered bananas, some were given treatment for injuries. They stopped being hostile. Now the Jarawas are no longer confined to the jungles and depend on settlers



for food. They visit settler villages regularly and accept fruit. Perhaps they are not getting adequate food in the jungle.

Our demand is that the Jarawas be brought into the mainstream as they themselves want to. For instance, in Tirur, a village under my panchayat, a Jarawa came to get his children admitted to school. The Jarawas can speak Bengali and Hindi. They ask us for cooked food. The food habits of the Jarawas have undergone a change. When a Jarawa is admitted to a hospital, seven-eight others come along as attendants because they like the hospital food.

Jarawa numbers have gone up and their child death rates have gone down. I believe, if the Jarawas are brought into the mainstream they will not die out as is portrayed internationally. Thirty per cent of the population of the Nicobarese tribe is now settled in Port Blair. They have jobs, they have bought cars, they

MOHAN HALDER is Sarpanch of Tushanabad Panchayat. He narrated this piece to Sayantan Bera

have become doctors. A Nicobarese girl has won a prize in cycling in the Asia cup. The Jarawas are excellent archers and can win us a gold medal in international competitions.

I cannot discount reports of poaching or sexual abuse in the Jarawa territory. The administration and the law of the land are meant to take care of that.

I am not suggesting that Jarawas be brought into the mainstream all of a sudden. It is a gradual process. For example, the administration can start banana plantations close to the Jarawa territory. The settlers can get work under the Mahatma Gandhi National Rural Employment Guarantee scheme. They will also slowly learn to protect the plantations. Conflict with settlers will come down.



G THEVA NEETHI DHAS is Secretary, Tribal Welfare, Andaman and Nicobar Islands

"The administration is a facilitator"

— G Theva Neethi Dhas

IN 1998 when the Jarawas became friendly with the outside world their population was 235. At present, they number over 400. The Jarawas have a unique lifestyle and live in harmony with nature. In the Jarawa Tribal Reserve area, entry of unauthorised persons is banned.

Jarawas have developed barter relationship with exploitative elements outside tribal reserve

In 2004, the Union Ministry of Home Affairs, framed a policy for the Jarawas. The policy is the bedrock of various measures undertaken by the administration of Andaman and Nicobar Islands. These include protecting the natural habitat and cultural identity of the Jarawas, monitoring their health and regulating traffic on the Andaman Trunk Road.

It is true that the Jarawas have developed barter relationship with the exploitative elements living outside the tribal reserve. The Andaman Adim Janjati Vikas Samiti (AAJVS) is sensitising the tribe on the issue. The administration is also taking penal action against the poachers.

But what is happening inside the Jarawa reserve is nothing unusual. There is no real increase in conflict. In fact, the administration has roped in the Jarawas in identifying encroachers and poachers. Since then, there has been a significant change in the Jarawas' self-perception and awareness. This drive is part of the administration's new policy built on research and community involvement. But all this has been underplayed.

During the recent elections, candidates did campaign for a liberal tourism policy, relaxing buffer zones, expanding the Andaman Trunk Road and bringing the Jarawas into the "mainstream". But we have no plans of pushing the Jarawas into a preconceived idea of "mainstream". Jarawas are allowed to take decisions when

negotiating with the outside world. The administration has adopted the policy of "listen and provide".

Efforts are being made to compile and understand what the communities in different stages of acculturation would like and why, before we just protect and provide. The concern is to keep their culture and identity alive and vibrant.

The Andaman and Nicobar Island Administration has set up A&N Tribal Research & Training Institute. The institute aims at directing research towards welfare policy, acting as a clearing house for research proposals, setting up a tribal museum and providing training.

"Listen, don't command"

— Manish Chandi

THE HISTORY of relations of Andaman islanders with non-islanders shows consistent interpretation, re-interpretation and misinterpretation of the notion of welfare of the indigenous communities of the islands. This perception, for some, is coated with the notion of primitiveness and of a need to assist and aid, which is largely driven by non-Jarawa yardsticks of well-being. In contrast is the perceived need to not interfere in their affairs that is more preservationist in outlook.

There is the issue of anthropologists, researchers or individuals being given access to engage with the Jarawas to understand their "well-being". This is an ongoing process and is being undertaken in a slow and nuanced manner by the well-informed field staff of the Andaman Adim Janjati Vikas Samiti, with a clear picture of contexts, conditions



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and influences—rather than by opening up the field to various or multiple interpretations.

Understanding the notion of well-being and the complexities involved in the customary livelihood of Jarawas is much more complex than what is allowed by regarding them as a primitive tribe. What is also now slowly being included within that notion of “customary” is their own choices of interaction with the world beyond their forests, which they are entitled to as free citizens.

There is also a history to how the State has dealt with such subjects when it has deployed the notion of “primitiveness” and of welfare through induction into the “mainstream”. That process has had no positive effect so far, at least in the Andaman islands.

There is a need to reconfigure the notion of welfare to very clearly include the possibility for a community to continue being itself but also, and still part of, the whole—this will not happen overnight, and it has to eventually come from the perspective of those who are seen as beyond or outside the mainstream, as well as from those in it.

It should be understood that to decide notions of well-being for someone else is imperialistic and unfair. This has happened to so many tribal and indigenous communities across the world.

Learning from this history, a strategy to increase participation of the Jarawas in expressing themselves, at their own pace and with a sense of community, is being put in place. This also means that the field staff and others who interact will need to learn and listen, rather than command. This comes with its own shortcomings (and benefits) because of various field conditions and human resource issues, though consistency

and sincerity are ingredients that will ensure that the process is inclusive, facilitative and participatory. It is not a simple or easy process because what a Jarawa or anybody else wants is prone to misinterpretation. The field is not closed to independent enquiry or research, though good quality proposals and relevant research are often hard to come by. There have been various proposals to research, document and interact with the Jarawas, but most of these lean towards being extractive in nature and have little relevance to addressing Jarawa concerns. There have been some positive proposals as well. There are important ethical issues with regard to extractive social, biological or ecological research, especially with a vulnerable community such as the Jarawa.

The issue of the dichotomies between the interest of the Jarawas and the settlers is also there. But there is a set of settlers who are more in tune with the conservation of the Jarawas. This should not be discounted. The tense relationship, in my opinion, is there not just due to a lack of understanding, but also because settlers have been misled for long, though some do have ambitions of encroaching the Jarawa Reserve.

Election manifestos will proclaim what a political aspirant would like to claim, but in my opinion, there is a due process to change. The dangerous issue is of interpreting what a community

To decide notions of well-being for someone else is imperialistic and unfair

wants, just because one sees the need to re-interpret that information impetuously for an election, or other purpose. It is not uncommon to hear that since some Jarawas know Hindi, or how to cook *dal* and rice, the time has come to integrate them into the mainstream.

Another reason, often unsaid, is of difference, of the Jarawas being seen culturally very



different from what is seen as a norm from the present majority and, therefore, the argument to integrate into the whole. Unfortunately, diversity is often seen as a problem rather than as an asset.

We have enough experiences of the outcomes of such actions in the past with the Onge and the Great Andamanese tribal communities. Their present predicament owes a lot to such actions. So, even with these communities there should be a policy of re-learning and re-invigoration, and strengthening their sense of community. With the Sentinelese, there is no policy yet to elicit information about them. The policy focuses only on ensuring well-being by eliminating, to the maximum possible extent, external threats and influences that have made inroads into communities such as the Jarawas. ■

MANISH CHANDI

is a research scholar with the Nature Conservation Foundation, Mysore, and member of the advisory board of the Department of Tribal Welfare and Andaman Nicobar Tribal Research Institute

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Towards a tusk-less future

The role of tusks in sexual selection questioned

KUMAR SAMBHAV
SHRIVASTAVA | KAZIRANGA

It is a bright afternoon in the Kaziranga National Park in Assam. A carefree, tusk-less male elephant (*makhna*) is rambling in the shallow waters of the Sohola Beel, a seasonal lake in the park formed by the flood water of the Brahmaputra River. A few kilometres away a herd of about 25 elephants—their bodies fully soaked in mud—slowly walks towards the *beel*. A tusker, about a foot taller than the *makhna* and with a pair of nicely elongated tusks, follows the herd. It interacts with a few females when other members of the herd scatter to forage in the grassland.

As the herd nears the *beel*, the *makhna* becomes attentive. It looks at the females entering the water. A few minutes later, it moves towards the herd but stops abruptly. Some females from the herd look at the *makhna*; one of them even covers a small distance towards him. The *makhna* doesn't move. The tusker was standing in the middle of the herd and was staring at the *makhna*. After standing in the same position for some time, the *makhna* turns back and walks away.

There is a good possibility that the female who walked towards the *makhna* was in oestrous and the *makhna* was looking for a chance to mate with her. But at the same time, the swollen temporal gland between the eye and the ear of the tusker and the small streak of fluid secretion on his cheeks from this gland indicated that the tusker had just started his musth phase. Musth is a temporary but intense sexual state arising due to elevated testosterone levels and the tusker was perhaps guarding the female from rival males. The *makhna* could not gather the courage to challenge the tusker and gave up without a fight.

This may sound reassuring for the followers of Darwin's theory of Sexual Selection: the elephant tusk has evolved in males as a weapon to win over females or as an ornament to attract them. The tusker winning over the *makhna* in the male-male competition thus only seems a foregone conclusion. Unfortunately, it is not.

The tusker at the Sohola Beel did not win because of the tusk. The *makhna* was very likely intimidated by the fact that the tusker was in the initial phase of musth and that it had a larger body size. According to a study by Karpagam Chelliah (Ph D student) and Raman Sukumar from Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, the musth state

and the size of bodies dictate mating advantage in elephants. Tusk plays a relatively minor role. When in state of musth, males go looking for oestrous females to mate with. They signal their musth status by secreting a smelly fluid from a temporal gland and through a pungent urine dribble. A musth male elephant defeating a larger non-musth male has been observed in African elephants by scientists Joyce Poole and Cynthia Moss way back in the 1980s. However, the importance of tusk in the male-male competition was not explored.

Chelliah and Sukumar conducted systematic, behavioural observations of male-male competition in the wild elephant population of Kaziranga, that is possibly unique because of the almost equal number of tuskers and *makhnas*. They found that a musth male would win over a non-musth male in most cases, irrespective of the tusk status. And if both the males are in same musth status, the male with the larger body size would dominate, again irrespective of the tusk status. "Since most duels were asymmetrical, one male was in musth the other not or one male being much larger in body size than the other, tusk came as an advantage only when two musth males of similar body size fought. Such symmetrical combats, however, were very rare; only 12 per cent," says Chelliah.

The tusker that won the contest at the Sohola Beel was larger than the *makhna* and in musth. So one cannot conclude that he won only because of tusks. "Had the *makhna* been in musth as well and of a larger body size, the tusker may not have won," says Chelliah.

Such results were initially puzzling for her. "I saw a tusker running away from a musth *makhana* of smaller size," and won-

dered, "how can a *makhana* who is just secreting a smelly fluid injure a tusker?" she laughs. But then we observed *makhnas* draping their trunks over an opponent's tusk and pressing down with their body weight. "Besides, the tensile strength of Asian elephants' tusk is lower than that of many bamboo species. Elephants can effortlessly snap bamboo culms with their trunk and body weight, and it is possible that they can do the same to an opponent's tusks, especially if they are long," says Chelliah. "The tusk does not seem to have the additional advantage of

being an ornament to attract females either," she adds. The study was published in the journal *Animal Behaviour* in September 2013.

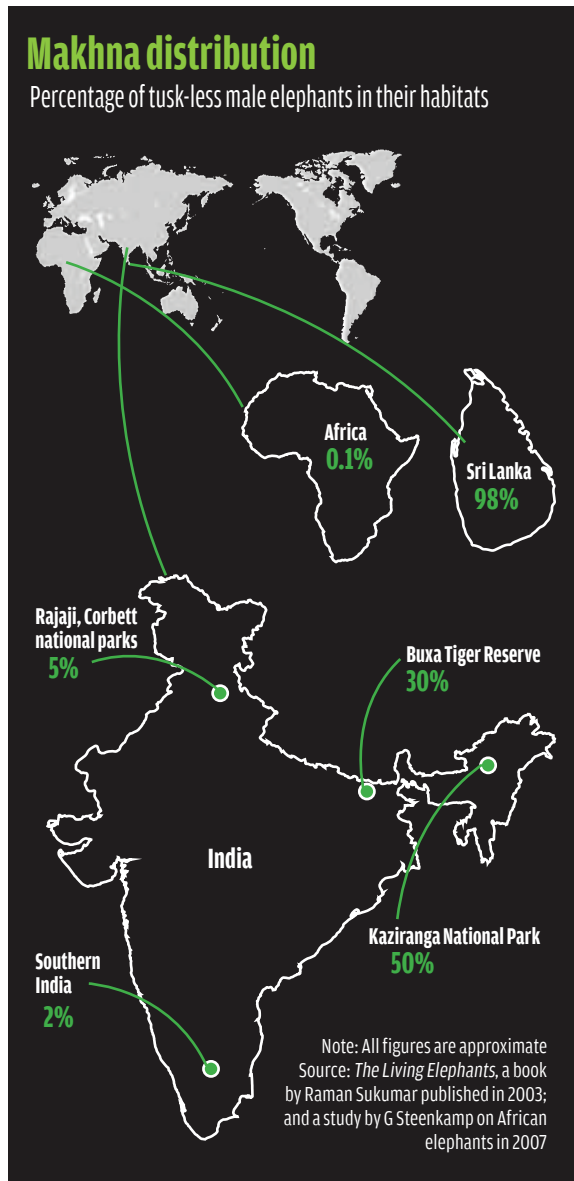
The disappearing tusk

Estimates by scientists and forest departments suggest 60 per cent male elephants in north-east India are tusk-less. This is in contrast to the elephant populations in south India where less than 10 per cent male elephants are tusk-less.

Scientists attribute high numbers of *makhnas* in the Northeast to deliberate removal of the tusk gene from the wild populations. "Tuskers have been selectively removed from the wild in the Northeast for about 1,000 years. There are historical records to show that tuskers from Assam and neighbouring states were supplied to be deployed in armies," says Sukumar. "Poaching of tuskers for ivory has also been prevalent in these states for several hundred years. The removal of the tusk gene has been over sufficient number of generations to bring a genetic change in the elephant population towards tusklessness," he adds.

"There has been rampant poaching of tuskers for ivory in south India, but only between 1970 and 2000. That would have affected only one generation and would not have caused genetic changes in the population," adds Chelliah.

In the Northeast the ratio of *makhnas* over tusker is only increasing. A 1995 study by scientists of Christian Albrechts University, Kiel, Germany noted that in the 19th century, *makhnas* were rare in north-east India. However, by 1950 *makhnas* were 48.7 per cent of the male elephant population and about 60 per cent by 1970s. According to the population estimates of the Assam forest department compiled by Bhupendra Nath Talukdar in his book *Elephants in Assam*, the percentage of adult and sub-adult *makhnas* in Assam in-



KARPAGAM CHELLIAH



"The tusk seems to be on its way out in Asian elephants. The silver lining is that the elephant will become immune to poaching for ivory"

– Raman Sukumar

Centre for Ecological Sciences, IISc, Bengaluru

Even tuskers do not use tusks for fighting. They mostly head-butt or wrestle with their trunks

creased from 62 per cent to 76 per cent between 1993 and 2008.

Does this mean Asian elephants are headed towards a tusk-less future? Perhaps, says Sukumar. "With only slight advantage of tusk in sexual selection, there is little possibility of revival of the tusk gene. Any external factor, such as poaching, that comes as a disadvantage for tusk will lead to 'tusk-lessness'," he explains. "Eventually, the trend of *makhna* crowding out the tusker will seep into other populations as well. To me, the tusk seems to be on the way out in Asian elephant populations," he adds.

In Sri Lanka about 98 per cent male elephant population is tusk-less. While the rea-

sons for this are not yet scientifically determined, it could perhaps be the first population to lose the tusk entirely.

A mystery unresolved

Evolution of the tusk, in fact, is one of the most intriguing, unresolved mysteries of the evolutionary biology. Fossils of elephant species that have gone extinct suggest that all of them had very long tusks. Of the three elephants species that survive in the world, tusklessness is a characteristic of only Asian elephants. In mildly poached populations of the African Savannah and African Forest elephant species, 99.9 per cent of the males and 98 per cent of the females have tusks.

"Six years ago when I asked Professor Sukumar why some Asian elephants do not have tusks, he asked me to find out why elephants have tusks in the first place," says Chelliah. Since evolution of the tusk was attributed to sexual selection I decided to verify this, she adds.

When Darwin could not explain the evolution of some of the exaggerated and seemingly useless ornamental male traits such as the peacock feathers or the antlers of the Irish elk through his theory of natural selection, he proposed the mechanism of sexual selection. He suggested that the males compete with each other to mate with females and the male trait may function as a weapon or the females may actively choose the most splendidly ornamented male for mating. So does Darwin's theory of sexual selection apply to the evolution of the elephant tusk? "It does not hold true for the present population of elephants. And there could be two possibilities in the past: the tusk either did not evolve through sexual selection or if it did, it evolved before the evolution of the musth. More robust studies are needed to verify this," she says.

While Chelliah and Sukumar are still working to find answers to why the elephant tusk evolved and why the females in Asian elephants do not have tusks, their study on tusk's role in sexual selection has made it clear that the tusk is on its way out in the Asian elephant populations. However, there is a silver lining in this. "The elephant as a species will survive. With this evolution, the elephant will practically make itself immune to poaching for ivory," says Sukumar. As Papul Rabha, a forest guard in Kaziranga, puts it, "I have always seen *makhnas* walking with their head held high unlike the tuskers. It is perhaps because they have nothing to lose." ■



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PATENTLY ABSURD LATHA JISHNU

The India effect

The US is targeting India's patent law because it is inspiring other countries to follow suit

TO HAVE ONE country challenge the mainstream view on intellectual property rights (IPR) may not be such a threat. It is quite another matter when more nations begin to follow suit. Then you are looking at the beginnings of a global insurrection that could undermine the basis of Western supremacy. Or so the US believes. This helps explain why the US trade authorities and powerful business lobbies targeted India on its IPR regime.

That the entire trade machinery of the world's mightiest economy should have been galvanised just because two European firms ran afoul of India's patent laws stretches credulity. The celebrated cases involve Basel-based Novartis which was denied a patent for its cancer drug Glivec because it lacked novelty and Bayer of Germany on whose costly Nexavar cancer drug a compulsory licence was issued.

So why were the Americans making such a ruckus over India's patent law which is fully compliant with global rules on IPRs? Admittedly, some key provisions of the landmark Patents (Amendment) Act of 2005 have raised the bar for multinational drug companies wanting to extend their patents beyond the original 20 years on incremental changes to a molecule they have discovered. But the true reason for the onslaughts on India's patent regime are to be found in the testimony of Roy F Waldron, chief intellectual property counsel of US-based Pfizer.

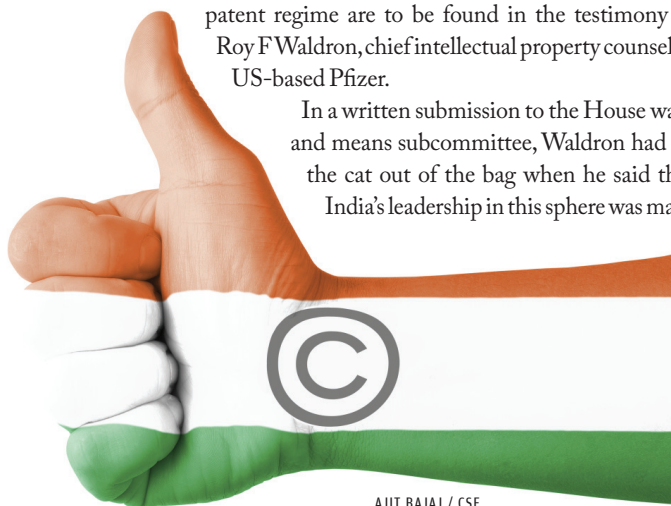
In a written submission to the House ways and means subcommittee, Waldron had let the cat out of the bag when he said that India's leadership in this sphere was mak-

ing US companies nervous. "Since many other countries look to India as a leader and an example, India's actions reverberate far beyond its borders. We have seen several countries adopt policies similar to India's, which are leading to a worldwide deteriorating trend on intellectual property."

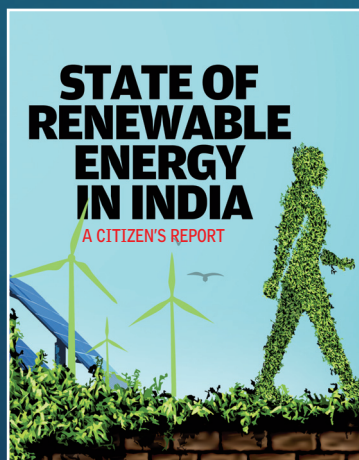
The last bit, of course, is an exaggeration. There is the United States Trade Representative's (USTR) hectoring annual review of the IPR record of trading partners that forces most countries to fall in line. And yet, a significant clutch of countries appear to have been inspired by India's clear-cut norms on what is patentable to change, chop and alter their own regulations on pharma patents. This becomes clear from the USTR's Super 301 Report which complains about the rules in countries as diverse as Brazil and Canada.

The most troublesome of the Indian provisions for drug multinationals is Section 3d which bars patents for incremental changes to an existing drug unless these can prove enhanced efficacy. It is this key safeguard that appears to have inspired a handful of other countries to define patentability of drugs in no-nonsense terms. Argentina, for instance, has tightened the criteria for the granting of patents by putting compositions, dosages, salts, esters and ethers, polymorphs, and other derivatives of a molecule under a strict scanner. The guidelines used by the South American nation are a carbon copy of India's Section 3d. Then there is Brazil whose actions are making the US distinctly edgy. Its health authority, the National Sanitary Regulatory Agency, has been authorised to review drug patent applications for patentability requirements. Canada appears to have gone a step further with its judiciary imposing heightened utility requirements for patents.

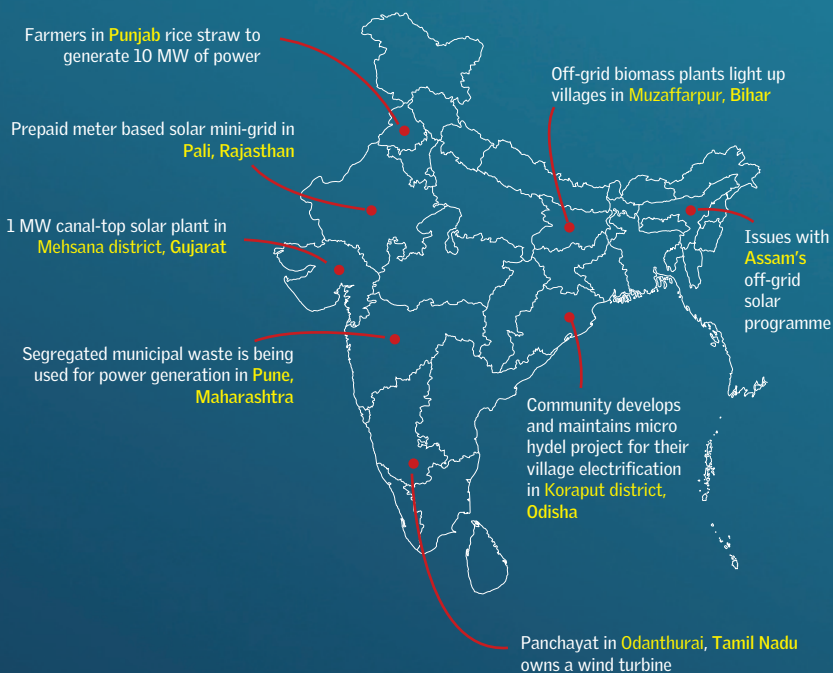
It is absolutely vital that more such countries band together to establish a balanced approach to patents before a lethal trade agreement is concluded. Under negotiation is the Trans-Pacific Partnership treaty through which the US is seeking to advance its most ambitious IP maximalist agenda. It goes way beyond what the World Trade Organization rules demand and it needs to be stopped. ■



AJIT BAJAJ / CSE



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Room for broom

A museum in Rajasthan uses brooms to showcase lives of village people

ANKUR PALIWAL | JODHPUR



DANIEL NEUMAN



Komal Kothari (left), who died in 2004, had envisioned the museum (bottom) after travelling across Rajasthan. His son Kuldeep Kothari started building the museum in 2005

A **BUNCH IS NEATLY** lined horizontally on a raised platform inside a hut. There is a tall bunch in one corner. One is carelessly perched over a roof made of terracotta tiles and bamboo. Another hangs loosely from the bamboo fencing around a cattle shed. A cluster of huts with dung- and mud-plastered walls and floors is an unlikely museum for an unlikely object. Located in Mokalwas village, 20 km from Jodhpur, Arna Jharna showcases brooms.

The museum has more than 160 varieties, each a window to the life, food, biodiversity, ecology and climate of the region it comes from. Brooms also indicate changes in the climate of their region. Arna Jharna, which literally means forest and spring, celebrates the traditional knowledge systems of desert linking everyday ordinary objects and practices with larger ecological concerns.

The museum is the brainchild of late Komal Kothari, affectionately known as Komalda. “My father believed that objects people use in their daily lives give an insight into their ecological wisdom,” says Kothari’s son Kuldeep. Kothari, along with his author friend Vijay Dan Detha, set up a non-profit Rupayan Sansthan in 1960 to study Rajasthan’s folk culture.



Starting from Borunda village in Jodhpur, the birthplace of Detha, the folklorist and the author started travelling across Rajasthan. “They wanted to understand the relationship between the people and their environment,” says Kuldeep. They envisioned the idea of starting a museum in 1990s to showcase objects people use, and the practices they adopt, to live and survive in desert. Broom was chosen as the object to inaugurate the museum.

Kothari, who died of cancer in 2004, devoted his last years writing down every detail about the museum. “We just had to follow what he had written,” says Anil Sharma, museum’s manager. The work to collect brooms began in 2005. We travelled across Rajasthan, he says. The first exhibition was held in 2009. The first visitors were rural communities. “We are glad that rural people visit the museum. If something is to be added or corrected, they will tell us,” says Kuldeep.

Broom ecology

Brooms in Arna Jharna broadly represent three food zones of Rajasthan, named after their leading crops: pearl millet, sorghum and corn. For example, “Sinya ke bungro” is made from a shrub, *sinya*. “*Sinya* normally grows in the pearl millet zone of western Rajasthan,

KULDEEP KOTHARI





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Arna Jharna museum near Jodhpur has more than 160 varieties of broom on display

characterised by sand dunes and black soil,” says Kuldeep. The broom is short in size which shows that the region gets less rainfall, he adds. A paper tag is attached to each broom that indicates its food zone.

Brooms also provide insights into environmental issues. “The decline in the use of a kind of broom is an indicator that the grass or shrub used to make it is getting scarce. This, in turn, is associated with changing land use or rainfall pattern,” says Shrawan Kumar Meghwal, a researcher with the museum.

Brooms connect us to the lives of their makers who are generally from marginalised communities—mostly Harijans, Bhils or Banjaras. “We have been making brooms for generations. But with rising inflation, it is tough to make ends meet,” says Gopal Banjara, who, along with his family members, makes around 400 brooms a month. “It costs me ₹7 to make one broom which I sell for ₹8 to the wholesaler. Its market price is ₹20-25,” says Banjara who does not know how to market his brooms.

Kuldeep says in rural Rajasthan, women make brooms from whatever is available in their environment. The same philosophy was used to build the museum. Every material, from the sandstone used

for the walls to the bamboo and grasses used for the roof, was sourced from the village. “The museum site was an abandoned sandstone mine. We used traditional knowledge of communities to transform a harsh and dry terrain into a terrain with lush green grasses and trees,” says Meghwal. The mine’s crater has been transformed into a lake, through rainwater harvesting. It is now nesting ground of birds.

“They patrol the museum at night,” says Kumar, pointing at a pair of owls which have made their nest in one of the huts.

Stories they tell

Brooms are often associated with Lakshmi, the goddess of wealth. It is said that Lakshmi graces houses which are clean. As brooms help in cleaning, they are associated with Goddess Lakshmi, says Kuldeep. Such mythological association means brooms are kept in safe places to avoid being brushed against or crushed under feet. It is said that one should not sweep after a loved one leaves the house as he or she may not return.

Legend has it that people take out some blades from the broom made of *daab* grass and keep it next to the body before it is cremated. “This grass always stays green and represents continuity of life,” says Meghwal. Brooms are also offered to temples to get rid of skin diseases.

“Every broom has rich mythological value. Brooms are never thrown away in Rajasthan,” says Kuldeep.

Brooms are just a beginning. Kuldeep and his team are collecting more materials of daily use that reveal the traditional knowledge of communities and their interaction with their environment. ■

Popular brooms



Gajra jhadu is made of date-palm leaves and is used to sweep cement surfaces



Sinya jhadu is made of *Sinya* shrub and is primarily used to clean cattle sheds



Gunchu jhadu is made by Bhil tribes using dried fruits of date-palm tree



Panni jhadu is generally made by Harijan men using leaves of *Panni* grass



Bald jhadu is made of *bald* shrub whose seeds are used in *laddoos*



Karvat Khejur jhadu is made by Verma tribes using date-palm leaves



Kheemp jhadu is made of *kheemp* shrub that grow on sand dunes



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RIGHT TO DISSENT LATHA JISHNU

Modi and irrational exuberance

India's youth is pinning its hopes of jobs on the development promise of Modi. Can he deliver?

A FIFTH OF the world's young people are Indians. That's a staggering figure in actual numbers: around 232 million who are between 15 and 24 years. Yet no one focuses on this huge youth bulge. Not academics, not even the social scientists among them for whom this segment should provide juicy research material. Not psychologists either and much less political scientists, who seem clueless as to what the young want.

Restless, aspirational and desperate for a better life, the youth should have been a priority for all politicians. But they weren't except for a 63-year-old shrewd politician who saw their potential. To them he sold hope—

and a dream. With his extraordinary marketing skills prime minister-to-be Narendra Modi connected with these teeming millions like few politicians have.

In Uttar Pradesh particularly, where 20 per cent of the voters were in the 18-22 year bracket, his message of growth and development appears to have struck a resonant chord. In this large, populous and backward state where the administration has been crumbling under

the incompetence of, ironically, a young chief minister the despair and hopelessness was rampant as *Down To Earth* discovered when it researched a cover feature a month ago (see 'Desperately seeking skills & jobs', *Down To Earth*, April 1-15, 2014) on unemployment among India's youth. Desolate employment exchanges had turned into volatile arenas where jobless young men and women scrambled madly for the unemployment doles handed out to a small percentage of their tribe. It is hardly surprising that Modi secured a thumping 71 of the 80 seats in Uttar Pradesh.



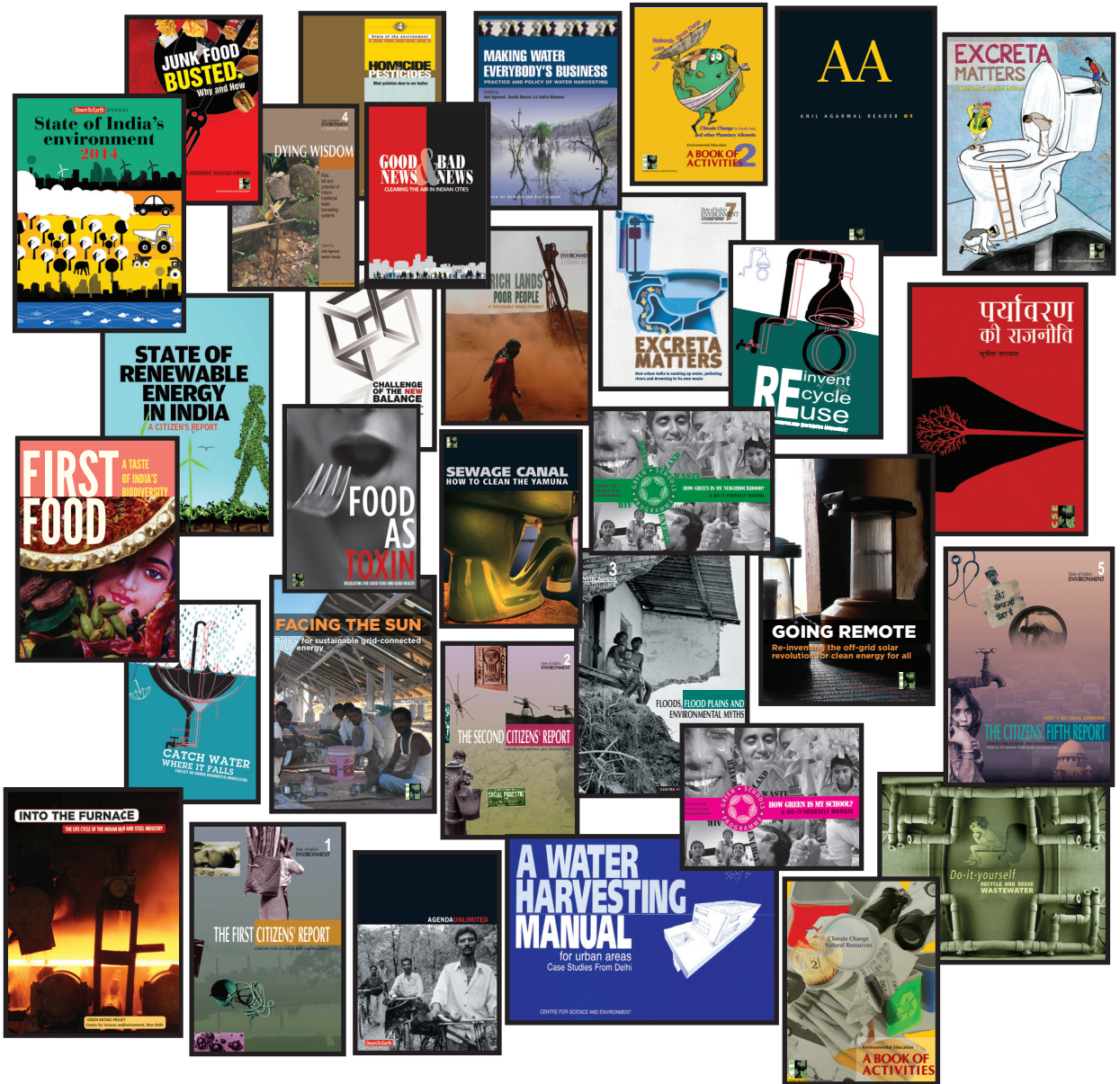
So Modi appeals to the young with his 56-inch chest and a compelling image of a strong leader. He connects as much with the Internet and social media-savvy youths of the cities as with the rural young desperate to leave behind their dirt-poor farming backgrounds for city jobs with decent pay. He takes 'selfies', he tweets continuously and his huge social media establishment has the right strategies. Just a day before the results were announced he unveiled an Android application, Jobs in GoG, that puts out details of government jobs available in Gujarat.

It hardly matters to the youth that the BJP leader portrays himself as a Hindu leader of what he has now declared a Hindu rashtra. To them the former RSS pracharak who will take India firmly into the 21st century holds out the promise of Gujarat's fabled development to the rest of the country. It's a model which they believe is a jobs paradise. This is irrational exuberance of a kind the country has rarely experienced. The 1984 elections may have given a much younger and a more personable Rajiv Gandhi and his Congress party a brute majority in the Lok Sabha but that was a different era with different expectations and the young were not so numerous then.

For Modi, meeting the aspirations of the young will be the most taxing of his challenges. He needs to stimulate the economy and create over 50 million jobs annually for the next 10 years to absorb the unemployed and new entrants to the job market. And there are fundamental anomalies in the economy he will have to deal with. India's economic model has been precocious, skipping the manufacturing stage almost entirely in favour of growth based on services. China did exactly the opposite because it knew that manufacturing alone could absorb the large numbers of unskilled labour coming from agriculture. In India's case, the focus on the service sector has been largely misplaced. It has offered more dead-end jobs than a ladder to better prospects. Can Modi revive the manufacturing sector at this stage? Even if he did manufacturing industries are now using high-end technology that reduces the job potential. But good days are here, tweeted the hope of the youth and they need to believe in him. ■

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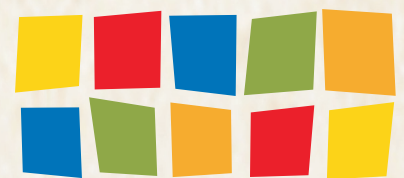
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