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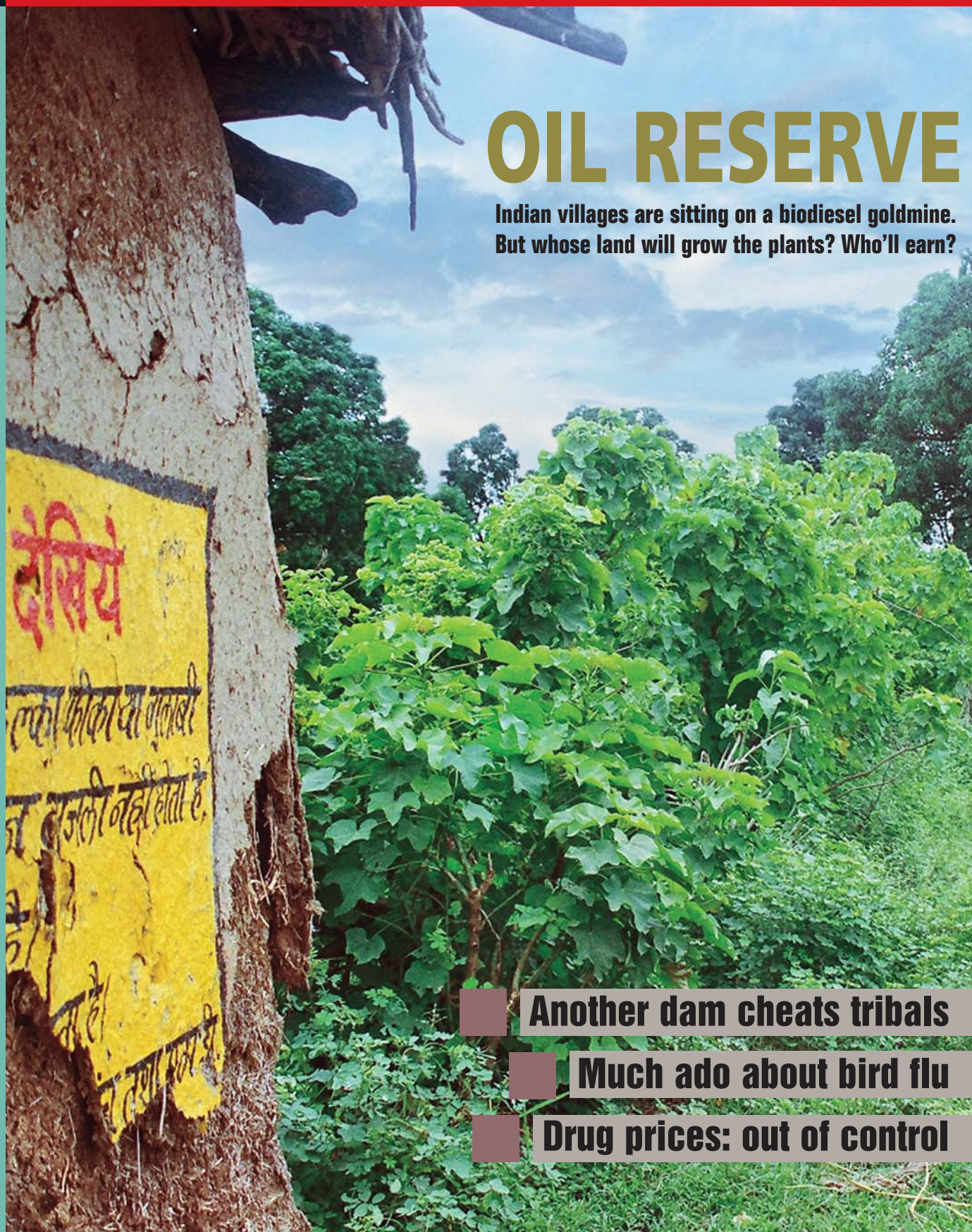
Down To Earth

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DownToEarth

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NOVEMBER 30, 2005

www.downtoearth.org.in

COVER STORY 30

The future of oil

It isn't just in the oil rigs. An important component of energy security is in the marginal fields of India, where biodiesel plants can be grown to make money for the rural poor. Pipe dream?



ANALYSIS 18

Bird flu: crying wolf

Are the dangers of avian influenza overestimated?

ON THE SPOT 40

No way out

The Kandi road through Corbett Tiger Reserve runs into controversy



OBITUARY 51

A man of conviction

Former President K R Narayanan

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57-76

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NEWS

- Supreme Court notice against closure of final tunnels of Tehri dam 13
- Ban on tree felling in Orissa scrapped 14
- UK patients are flocking to Spain 14
- Labels will now show heavy metal levels in traditional medicines 15
- Holders of the terminator gene patent enter India 16
- Safety measures suggested for cellular phones 17

SCIENCE & TECHNOLOGY

- Health risks of silver foil on sweets 24
- Why one should be happy about HapMap 25
- Impressionism: of bees, colour and robots 26
- Anti-bacterial soap doesn't make for best hygiene 26

INDUSTRY & TECHNOLOGY

- Ec-friendly method to make nylon found 28

SPECIAL REPORT

- Government struggles to control drug prices 29

GRASSROOTS

- Temple offerings in Mumbai used to make manure 42

INTERVIEW

- S C Tripura: State robbing people of their land 45

CIVILISATION

- A conference in Italy deliberates the troubled non-relationship between science and religion 46

CROSSCURRENTS

- Plans for post-tsunami housing illogical 48
- India should rethink power generation policies 50

LETTERS

2

EDITOR'S PAGE

5

LEADER

6

THE FORTNIGHT

9

REVIEW

52

MEDIA

54

FACTSHEET

56

COVER PHOTO: RUKSAN BOSE



SURYA SEN/CSE

Dead write

I read the story on Japanese encephalitis (*Down To Earth*, October 15, 2005) in the Eastern Uttar Pradesh; page by page, word by word as it showed the truth, the fallacies and the politics.

Just as you had witnessed, during my tenure too the district administration was in the mess while I headed a team that was dismally ill-equipped and hardly trained to handle the crisis.

We did whatever best possible could be. We did not let the people panic and affect other walks of public life. As a sensitive and focused reader, I must appreciate your approach by which you have covered the entire gamut of issues. I must honestly congratulate you on penning down an almost exhaustive, thought provoking but positive report on the malady.

Japanese encephalitis has been a quarter century-old menace to people in this area. But this time, I think, the outbreak has opened the eyes of all who are answerable to the public.

HARI OM
District magistrate
Gorakhpur

Quackery and quakes

It is rightly pointed out that there was a discrepancy in the measurement of intensity of earthquake by (*Down To Earth*, October 31, 2005). It is quite appalling the way earthquakes are measured and monitored by the Indian Meteorological Department where meteorologists dominate and seismologists occupy insignificant positions. India has experienced numerous earthquake of severe intensity in the past. The *Vulnerability Atlas of India* shows that all eight states in northeast India, parts of Jammu and Kashmir, Himachal Pradesh, Uttaranchal and the Kutch region of Gujarat states are sitting on

the bed of earthquake-prone areas. Therefore India needs a network of GPS-based (Global positioning system) seismological observatories. As the article points out India should join Incorporated Research Institution for Seismology, Washington without delay. It is heartening to know that the Department of Science and Technology has established an Earthquake Evaluation Research Center (EERC) at New Delhi. EERC should now be entrusted the specialised assignment of manning most of the 212 seismological observatories and networking them for compilation of earthquake data.

BRIJESH BARTHWAL
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A dream ?

As the article rightly said (*Down To Earth*, October 15, 2005) that river-linking scheme is like the Emperor's New Clothes. To link the Ken and Betwa rivers, Uttar Pradesh and Madhya Pradesh governments, together, will spend Rs 30 crores to merely get the project report prepared. What a waste. Then they plan to spend Rs 4,000 crore to implement the project.

We can go in for such schemes provided there are no alternatives. But with Rs 4,000 crore we can treat 4 million hectares (ha) — 1.2 percent of our total land area. Similarly with the amount that is required to link all the major rivers — Rs 5,60,000 crore — we can treat 500 million ha using watershed development methods.

We need to ensure that national water planning is entrusted to hydrologists. It is possible to banish drought if



Asocial deforestation

Following the recent Judgment of the Madras High Court on encroachment, the officials are preparing to undertake a large-scale cutting of around 200 trees in Senthamangalam panchayat of Vadipatti Taluk of Madurai District, Tamil Nadu.

A number of economically deprived people are taking care of these trees. Some local people have taken selective trees on lease and pay their dues regularly. But now they have been told that the trees are to be cut. This is absolutely against the spirit of social forestry and the forest policy of our government. The district administration has been informed about this but to no avail.

A KANNAN
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the government puts its mind to it.

Let's not the country's average annual rainfall is 1,170 mm. So, if activities like rainwater harvesting are initiated on a large-scale and the entire arable area is brought under watershed development, there is absolutely no necessity to link our major rivers and invite a major catastrophe.

MALLIKARJUN SHETTY
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Belgaon-590001

PICK OF THE POSTBAG

Losing the scent

The article on Kalanamak was excellent (*Down To Earth*, September 15, 2005). There is an exceptionally high quality of basmati rice called the Tapovan Basmati, once cultivated in a particular village, Tapovan, Uttarnachal. I had earlier reported that it is at the verge of extinction. Only a couple of days back I visited Tapovan village and was shocked to learn that this variety is now extinct. We could not find a single grain. The

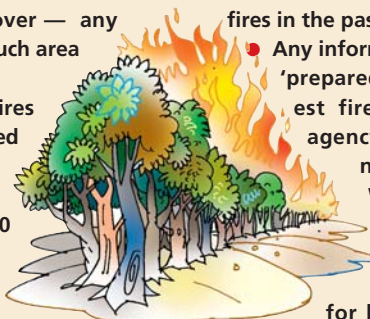
village is close to Rishikesh, and almost all land here been sold to settlers. Few fields that are being cultivated this year are under high yielding non-scented rice varieties. Fortunately we have with us few gemplasm of this variety collected six years ago from that village.

In India we talk a lot but do practically do little to save our diversity.

U S SINGH
ussingh3@rediffmail.com

L C Jain asks, is there some data on:

- Shrinking forest cover — any numbers on it? How much area lost over what period?
- The frequency of fires has apparently increased with time — any records of recorded fires over last 100-30 years?
- Lantana is one of the 100 worst invasive species — which one or two species are on top of this list
- Which regions of India are lantana prolific and are likely to be vulnerable to forest fires in the coming years?
- Any estimates of loss of life, animals, forest area/wealth due to forest fires in the past decade?
- Any information on our state of 'preparedness' to combat forest fires? Is any particular agency in-charge at the national or state level? Which state is best prepared?
- Has any compensation been paid for loss of life, cattle, or forest wealth due to forest fires in the past decade?
- What is the recorded worst forest fire in India and rest of the world?



L C JAIN
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Cooperatise the forests

Look at bamboo and paper mills in states besides the northeast that the story, "Mautak will flower", mentions (*Down To Earth*, October 31, 2005). Since 1990s, the paper mills in Andhra Pradesh switched over to farm plantations from bamboo. As a result lakh of tribals working in bamboo extraction lost their livelihoods. Way back in 1987 in an address in Administrative Staff College of India in Hyderabad, B D

Dandakaranya' stated, "India is the only country in the world that uses bamboo as a feedstock for paper manufacture on a massive scale. China is also a 'bamboo country' with extensive bamboo cultivation, but it uses only 10 per cent of its bamboo for paper manufacture whereas India apports over 2/3 of its extraction for this use." We should learn from the way China manages its resources.

P SIVARAMAKRISHNA AND
P SARADA DEVI
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NININ SETHI / CSE

Sarma suggested to entrust bamboo extraction to tribal families linking them to the paper mills and other consumers of bamboo. He proposed that the tribal become shareholders in the wood and bamboo industry. He cited the example of sugarcane grower cooperatives managing sugar factories, particularly in Maharashtra.

Government should enable the tribals and forest dwellers to sustainably harvest the growing stock of our forest and involve them as partner in the progress.

China has done so. Interestingly late Vinoo Kaley in the book 'Bamboo in

No hearing here

The story on Environmental Impact Assessment (*Down To Earth*, September 15) reminded me of the time I witnessed the public hearing of Mali Parbat Bauxite mining project of Semiliguda block of Koraput district in Orissa, where HINDALCO Industries Ltd were seeking environmental clearance for 6 lakh tonnes of bauxite mining per annum from 268.11 ha in Khudi, Pakjhola and Potangi tehsil of Koraput district.

I was in the district and began searching whether the executive summary report is available at the designated place or not. Most of the designated offices were not aware about any such notification. Some officials claimed they did not deal with such matters while others clarified that they did not have any instruction from the state pollution control board.

In such a complicated and lethargic official system I tried for several days to

get an environmental impact assessment report from the Koraput district magistrate's office, but all my efforts were in vain. When I contacted another designated office for the report—the Block office—the senior officials again were clueless, though one assistant project director did assure me that within a week I would hear about it.

Even at the NALCO division in the district magistrate's office declined to share the Executive Summary Report claiming it was not available.

I then emailed a letter to the member secretary of the state pollution con-

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trol board but the email bounced back. I have hit a dead end. How long will it take for an average citizen to be given the right to information? Why is there is such utter lack of co-ordination among various government agencies? Will anyone answer?

CHAKRADHAR BEHERA
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Hearing, only in name

The story, 'Discontent' (*Down To Earth*, September 15, 2005) shows several lacunae in the way public hearings are being conducted all over India. EIA was introduced with the purpose of identifying and evaluating the potential beneficial and adverse impacts of developmental projects on environment taking in to account environmental, social, cultural and aesthetic considerations.

In the last eleven years, there have been twelve amendments to the process. Some of these have had far reaching

implications for people and environment. A number of projects with significant environment or social impacts have been excluded from mandatory public hearing process.

The recommendations of the public hearing panel are only advisory and are not taken seriously while granting clearance to projects. Moreover, the EIA reports contain false or inadequate information. Their conclusion is inconsistent with the information and data, resulting in biased outcomes.

There seems to be little political will to uphold the principles behind the

environmental impact assessment notification or even the clauses of the notification. This is clear from the fact that through the ministry of environment and forests has the powers to reject a project if it violates the notification; it has not done so in several cases those were brought to its notice by NGOs and community groups.

The thirteenth amendment in the EIA notification, made in July 2005 says that any expansion or modernisation project of selective character — nuclear, river valley, river valley ports and harbors, thermal power plant and mining projects — may obtain temporary permission up to a maximum of two years till it gets environmental condition. The thirteenth amendment is in name of public interest, but in reality it will only benefit large-scale government projects.

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Down To Earth welcomes letters, responses and other contributions from readers. We particularly welcome you to join issues and share your opinion with others. Send to Sunita Narain, Editor, *Down To Earth*, 41, Tughlakabad Institutional Area, New Delhi - 110 062. Email: editor@downtoearth.org.in

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C for clean



I remember many years ago receiving a call from a BBC journalist asking which villages in India should they visit to see the impacts of climate change. This was the early 1990s. I was puzzled and asked “is climate change here?” Finally the television crew decided to shoot urban fires in Delhi and drought in Rajasthan to tell their viewers about how India was reeling under the impact of changing climate because of increased greenhouse gas emissions.

I wonder what I’d say if I got a similar call today. Would I point to recent cloudbursts and cyclonic events, which have more or less drowned several major metropolitan cities in the country? Would I point to the obvious variations and extreme weather events — from heat waves to freak snow episodes — to say that our climate has changed?

Clearly the answer isn’t simple. It is true every Indian city that has drowned under the weight of its rain has suffered because of the progressive mismanagement at the hands of its city managers. It is true also that the intensity of floods and drought has increased because we have made the poor even more vulnerable to weather events — either by destroying the wetlands that absorbed the water or by simply ruining the land economies of people, which would sustain them in times of stress.

It is also true that our weather is changing. In other words, we have a double-whammy — already stressed regions and people who will be further hit. It is imperative that we reduce our vulnerabilities by doing ‘good’ development — investing in the natural

resource base of people to mitigate against drought and floods. Simultaneous it is also imperative that we reduce global emissions so that the threat of climate change is contained.

It is for this reason that the world governments party to the convention on climate change came up with the Clean Development Mechanism (CDM). The idea was simple: the industrialised north had to reduce its emissions, partly because its emissions were already leading to the threats of climate change and partly because to provide economic and ecological space for the South to increase its emissions.

Two facts were clear: one the North could really not reduce its emissions substantially as it could not de-link from the fossil fuel economy that drives growth. Two, the South did not have to make the mistakes of the emission-flatulent parts of the world. It could re-engineer its growth trajectory so that it would be more efficient or less dependent on fossil fuels. It was this reasoning that led to CDM — so that the North could pay for the cleaner development in the South and get credits in its own carbon balance sheet. It was to be a win-win situation.

This was not to be. In our study of the working of CDM (see ‘Newest, Biggest Deal’, *Down To Earth*, November 15, 2005) we find that it has become a market mechanism simply — an agreement between private parties looking to make a fast buck. It is, as we show, not just the complicated development mechanism but also the corrupt development mechanism, which is leading to poor quality projects.

It is important to consider why this is so. It will be easy for commentators in the developed world to blame these transgressions — corruption or poor project design — on the governments and industries of the South. But the answer is not so simple.

The fact is that governments (rich) have worked overtime on the design of CDM so that it is what it is today. For instance, the rules and procedures that have been developed for CDM are extremely convoluted and cumbersome and are leading to ineffective projects at

the country level. Take the criterion for “additionality” — what can be done without a CDM project — which is in turn leading to really creative carbon accounting and poor quality projects. In fact the current rules create perverse incentives for governments to do little to combat climate change.

These over-developed criteria are purportedly the response of the rich governments and their NGOs to protect against “business-as-usual” dirty projects, which they believe Southern government would want to push through in the garb of CDM. They don’t trust the poor country governments. The result is bad rules made for bad projects.

The second problem concerns high transaction cost (and procedures) — because of the compulsory involvement of private auditors and their procedures, which in turn negates the involvement of community and small projects in CDM. This was done by rich governments and their NGOs to protect against the lack of credible procedures in the South.

But look at the end result. The procedure stipulates that the project proponent hires the consultant to do the project design and then hires the authorised validator to certify the project, based on the consultant’s report. In other words, the entire process is regulated by mutual self-interest. It is no wonder that *Down To Earth* indicted two internationally acclaimed auditors — namely, PricewaterhouseCoopers and Ernst & Young — for fraudulent project design documents.

I could go on. But the moot point is that the design of CDM is flawed. It keeps prices low; it forces the South to discount its advantage in reducing emissions. It does little for combating climate change. If the threat of climate change is real, then the answers to it must also get real. CDM is a half-way house because it does not build a global climate regime based on entitlements for all. But it can deliver the building blocks of a cleaner tomorrow. For this we must do things differently. Much more differently. ■

— Sunita Narain

A scoop

Geopolitics of oil, circa 2025



A DARK cloud is fast approaching the night sky of Chhattisgarh. The emergency briefing on the other side of the globe by the director of Convoluted Intelligence Agency (CIA) just got over. President Push paced up and down in his Elliptical Room, this crisis is a bit confusing. Outside the Grey House, another contingent arrived, surrounded by men in black. Secretary of State Ms Price suggested the president talk to Pony Flair, a friend in need.... "Get me Pony," president mumbled. The backroom boys were playing monopoly. They suddenly broke into laughter. President got annoyed. But in backroom monopoly, for the first time, plant genetics guys scored over oil guys.

"Pony, we got the WMD...errr...no...it's a different one...no...trust me...this one is real."

Back in Arjunnagar in Chhattisgarh, in the dark of the night, Jethro Sahoo is holding out with two hundred-odd brothers and sisters, with no knowledge of what was going on in the Elliptical Room. It is the sixth day of the highway barricade stopping movement of all trucks carrying jatropa seeds — trucks on Chhattisgarh highways these days carry only jatropa seeds (see pp 30-39). The All Chhattisgarh Jatropa Growers Association has called for removal of all foreign oil companies from their land. Jethro Sahoo, convenor of Oil Swaraj Movement, has already been interviewed widely in Western media, with Terrorism News Network (TNN) virtually calling him a terrorist. This crucial coverage caught the imagination of Ms Price, who has been looking for an excuse to move in. She had found the next brewing ground of terrorism. The road blockade was absolutely unpardonable. Last night, all oil corporate bosses met her with a request to do something.

Do something? There is so much to do. Hexagon has been alerted, in anticipation of a positive reaction by the president. Hexagon, in turn, has alerted all installation in Indian Ocean. In the meantime, Ms Price worked out with the backroom boys on the Wealth of Massive Diesel (WMD) angle.

Media fixers in the Grey House quickly meet and warn president against any hasty action. After all, Oil Swaraj was a peoples' movement. "Can't we link them with any terrorist group?" Push insisted. The request was transmitted to the policy group on South Asia. There is one possibility, they worked out. They need to link Oil Swaraj with the local terrorist group, Peoples' Wealth Group (PWG). That was it — the stealth bombers took off. Jethro Sahoo was sleeping in front of the barricade. ■

QED. Amen

Against religion in a laboratory and science in a church



THE attacks on the practice of science — from religious establishments — are symptomatic of a confusion of issues (see pp 46-47). While there is no question about the fact that religion and science have sociologically important roles, it should be obvious that there is no epistemological symmetry between the two. Which means arguments emanating from the realm of science should not — and, in fact, cannot — be used to undermine matters of faith. And, similarly, matters of faith cannot be used to undermine the progress of science. There can, possibly, be arguments against, say, cloning or stem cell research — but they can come only from principles relating to the broad church of humanism.

The question of the epistemological status of religion and science is best showcased in the creationism debate. In several countries of Europe and the US it has been argued that students should be given the choice of studying creationist, Biblical theories as an alternative to scientific theories about the creation of the universe. The idea is sheer bunkum.

Creationist theories are not based on any form of verifiable evidence, and do not follow the principles of testability, the very hinges of science. Doubtless, people are free to believe that god created the world. But that belief cannot be elevated to the status of science and taught in a science curriculum. Equally, no one should have the right to ban the teaching of scientific theories or pursuing research or even exercising lifestyle options — abortion ought not to be outlawed on spurious grounds connected to, for instance, Catholic theology. Nor should there be a recurrence of the infamous Scopes monkey trial case of 1925, in which a teacher in a State-aided school in the US was fired for teaching the Darwinian theory of evolution.

Religion, a philosopher famously said, is the heart of a heartless world, the sigh of the oppressed creature. Thus far the going is good. But what it cannot do is set the conditions under which the pursuit of knowledge of the physical world or scientific innovation must happen. Obscurantism is not the way to moral and material progress. The church could not stop Galileo and it is unlikely that it will be able to stand in the way of his intellectual inheritors. ■

Get out

Same old story. Dam threatens to displace tribals to appease rich farmers



RAMAKRISHNA SANGEM *Khammam*

THE Polavaram multi-purpose project to be built across the Godavari threatens to displace hundreds of thousands of tribals in Andhra Pradesh (AP). The writing is, almost literally, on the wall. "Officials have come and put red marks (to identify villages in the submergence area) on our walls recently. We have been unable to eat and sleep since then," said R Amarnath, a labourer in Vaddiguem village of Khammam district.

The dam will come up at Polavaram, where three districts — East Godavari, West Godavari and Khammam — meet. The reservoir will have a total storage capacity of about 325 thousand million cubic feet (tmc).

The 46-metre-high dam, which has got an environment clearance from the Union Ministry of Environment and Forests (MOEF), will cost Rs 9,072 crore. It will displace about 200,000 people; at least 150,000 of them tribals, the rest mostly dalits dependent on minor forest produce for livelihood. It is awaiting forest clearance because the submergence area includes the 702-hectare (ha) Papikonda wildlife reserve. MOEF estimates 40,060 ha will be required, including 3,279 ha of forestland.

The ministry says 193,350 people will be displaced: 175,275 in AP, 6,316 in Orissa and 11,766 in Chhattisgarh.

The submergence area includes 170 habitations of mostly Koya, and Kondareddy tribals.

Battle of attrition?

Those facing displacement are not about to give up without a fight. Though AP government forced the environmental clearance through — a public hearing was conducted on October 10 in Khammam district at which people were not allowed to raise their objections — there is resistance, with protests becoming routine in Khammam, and East and West Godavari districts.

The desperation is clear. "*Maa meeda oka baamb veyya manandi, samasya teeri potundi* (Let them drop a bomb on us, the problem will be solved)," screams K Kanna Reddy, a Kondareddy tribal in Kotarukommu village of Vara Ramachandrapuram mandal in Khammam, surrounded by a dozen young men and a few old women

on the road that abuts the Godavari.

In Telugu, Kotarukommu literally means the last point. Those assembled there really feel they have reached the last point in their survival saga. Kanna Reddy says though officials have told the villagers to leave, they have no such plans. "Where can we go?" he asks. Venkat Reddy, 20, and Prasad Reddy, 18, standing next to him, point to a primary school. "After fighting for 10 years, we got the school. Will it be with us tomorrow?" they ask.

"We would rather die here, than move out of our village," says Venkata Ramana, 20, a Koya youth in Vaddiguem village in Khammam. "We do not want government compensation. We can live just by drinking Godavari water," says Narasamma, 50. A young man adds: "Except for the government, nobody here wants this dam."

Rajeswari, a 25-year-old dalit, and her neighbours in Khammam's V R Puram echo the sentiment. "Where is the guarantee that we will be properly rehabilitated tomorrow? We have heard how governments ditch the displaced once the villages are vacated," says Rajeswari. "For us, this dam is worse than a tsunami," says Sri Rama Murthy, a Koya. "We will take up bow and arrows, if necessary."

It's not just the spectre of displacement. There is anger that the interests of



Where is the guarantee we will be properly rehabilitated tomorrow? We have heard how governments ditch the displaced once the villages are vacated

— RAJESWARI
Resident of VR Puram, Khammam

the tribals are being sacrificed for the benefit of rich farmers in the coastal area. Puli Boobamma, a Koya woman from Rekhapalli village, says the government always protects the interests of non-tribals at the cost of the tribals. "We are being sacrificed for the sake of rich farmers in delta region," says Sondhi Veeraiah, 30, a Koya activist. He was arrested last week for an attack on the V R Puram mandal revenue office.

Regional discrimination

It does appear that AP chief minister Y S Rajasekhara Reddy has powerful compulsions that have everything to do with

stabilising the supply of water to the ayacut (command area) of the Godavari barrage in East and West Godavari district, which will benefit the powerful farmers of the area who provide the financial and muscle power to all political parties in AP. The Polavaram dam will irrigate 291,000 ha in Visakhapatnam and East Godavari districts through one canal and West Godavari and Krishna districts through another.

Other benefits of the project are likely to skip the tribals. It will divert 80 tmc of Godavari water to the Krishna river to stabilise the existing command area under the Prakasam Barrage and provide drinking water to 2.5 million people in 540 villages en route. Channelling water from the Godavari to the Krishna to benefit the farmers of Krishna, Guntur and Prakasam districts will also help divert 40 tmc from the Srisailem reservoir to the Rayalaseema



A new Konda Reddy housing colony

region, where the chief minister is from. The project will also generate 960 MW of power, which is unlikely to help those displaced.

Not unsurprisingly parties have by and large not opposed the project — the Communist Party of India-Marxist (CPI-M) called for a redesign so that the submergence area decreases. Only environmentalists and non-governmental organisations (NGOs) have demanded the project be scrapped (see box: *Damning views*). They have been joined by those — including Pradesh Congress Committee president K Kesava Rao — who argue that an injustice is being done to the Telengana region.

The suspicion of bias has been reinforced by some incidents. Last month, former MP and TDP leader Mudragada Padmanabham went on a fast unto death, forcing the government to

DAMNING VIEWS

The scale of displacement under Polavaram project is unprecedented and government has no proven capacity or commitment to rehabilitate the displaced. This project will not only hit lakhs of people, but also endanger the delta (with excessive water logging). So, government should give up the entire project

— P SIVARAMAKRISHNA of Shakti, an NGO working in the affected areas

Going by its track record, we cannot believe governments can rehabilitate them properly

— RATNA REDDY, natural resources economist and professor at the Centre for Economics and Social Studies, Hyderabad

promise that the farmers in the East and West Godavari districts who lose their land will be given an equal amount of land in the ayacut. But, there are no promises for the tribals and dalits.

The administration is obviously gung-ho. The chief minister is hard-selling a rehabilitation package that he says is the first of its kind in the country (see box: *Rehab recipe*). The state government announced this package after consultations with environmentalists, experts and NGOs on April 8, 2005.

This 'improved' package offers compensation not just to the landed but also to the landless. But it has many loopholes. Bhadrachalam division, for instance, is a Scheduled Area where many people do not have title deeds to their land. They will lose out.

Major irrigation minister Ponnala Lakshmaiah, however, told *Down To Earth* the government would take care of the affected. "We will give top priority to the concerns of the displaced."

Major irrigation principal secretary C V S K Sharma was even more optimistic. "This project will have a tremendous impact on the economy of the state. It is a historic project in river linking," he said. Every year, 3,000 tmc of Godavari water flows into the sea and is wasted, he pointed out.

On the concerns of the displaced, he said: "A Rs 4,500-crore rehabilitation package has been prepared for this and AP's policy is the best in the country." Responding to the CPI(M)'s demand for redesigning the project, he said the government had appointed a committee headed by retired chief engineer Hanumantha Rao. ■

REHAB RECIPE

- Free houses for displaced people at the rate of 125 sq metres in rural areas, and 63 sq metres in urban areas
- A one-time grant of Rs 40,000 for constructing houses. A one-time grant for land development — Rs 10,000 per hectare (ha) in drylands and Rs 5,000 per ha in irrigated lands. A one-time grant for cattlesheds: Rs 3,000. A one-time allowance of Rs 5,000 for transporting materials
- A one-time grant of Rs 25,000 for supporting income-generating schemes to displaced families
- If the affected persons becomes landless after land acquisition, another plot of land to an extent of 2.5 ha in dryland areas and 1.25 ha in irrigated areas will given; If the person is landless, an equivalent sum of 750 days' agricultural wage and a one-time allowance of 500 days' wage will be given. Presently, the minimum agricultural wage here is Rs 82 per day and maximum wage is Rs 91 per day
- If the displaced person becomes a small farmer after land acquisition, an equivalent sum of 375 days' wage will be given and if the person is already landless, a sum of 625 days' wage will be given. This is in addition to a subsistence allowance of 240 days' wage
- The new rehabilitation package of AP also stipulates that people in a habitation or a community shall be rehabilitated at a compact area in the same way it existed earlier. Maximum care shall be taken to ensure that they would be shifted to the nearest place.

ENERGY / USA

Alaska oil ban repealed by the Senate

The US Senate recently voted down an old and controversial ban on oil drilling in Alaska's Arctic National Wildlife Refuge (ANWR). This win for the Senate, supported by President George W Bush, was a close call. The Senate narrowly missed the Democratic Party's attempt to halt the repeal of the ban. The ANWR oil exploration plans, signed into a law in 1973, by President Richard Nixon, has remained controversial ever since.

Supporters of drilling say access to the estimated US \$10 billion plus barrels of crude oil in ANWR would boost revenues of American oil companies, which would like to explore the area for petroleum. Also the expansion of the oil industry in the Northern Slope would create thousands of jobs and decrease US dependency on oil imports from Middle East and Latin America. It would help lower the price of oil for American oil consumers, increase federal, state, and local tax revenues, and lower trade deficits.

People opposing the repeal of the ban say it would threaten a key habitat for migratory birds, polar bears, caribou and other animals. Many environmental conservation groups have formed a



Barrels of oil take over the Arctic National Wildlife Refuge

broad coalition against this repeal.

The drilling plan, which has already survived one attempt to halt it, is part of a federal budget-cutting bill. And experts feel that it may yet fail to clear both houses of Congress.

Besides this, senators also voted overwhelmingly to prohibit exporting any of the oil pumped from the region as US has to import three out of every five barrels of oil it consumes.

In this regard, President Bush praised the Senate for backing a "common sense approach" to improve the US energy situation. ■



The picture shows the break-up of the five year old B-15 A iceberg — world's largest free-floating object — in progress off Antarctica's Cape Adare. It was taken on October 30, 2005, by Envisat's Advanced Synthetic Aperture Radar (ASAR) in wide swath mode. The latest imagery has revealed the bottle-shaped iceberg being split into nine knife-shaped icebergs and myriads of smaller pieces.

>> Army contractors halted operations at the Newport Chemical Depot, in western Indiana, as nearly 500 gallons of caustic wastewater containing hydrolysate, leaked into a sealed area at the facility. This plant is used for destroying Cold War era chemical weapon VX.

>> A regional conference on sustainable transportation and air quality held in Bangkok warned that Asia's cities, boosted by economic prosperity, were facing increasing gridlock. It proposed to take up urgent measures to promote mass transit systems. Bus and underground railways were possible solutions though they involved high cost and low returns.

>> The Spanish fisherfolk's agitation, demanding US \$0.11 a litre increase in subsidies, ended. The blockades affecting Spanish ports were to be lifted immediately. A demand for a new package of tax breaks was also made. The meeting had representatives from the ministry of agriculture and fisheries and the fishing brotherhoods.

>> South Africa's main port, Durban underwent clean-up operations after 80 tonnes of bunker fuel spilled into the harbour. The spill happened when a ship was damaged off the coast of neighbouring Namibia, while berthing at a flocking dock for repair. However there were no major disruptions to traffic at Africa's busiest harbour.

>> Japan recently rebuffed USA's demand to ease its stand on US beef imports. Japan had banned US beef in December 2003, after the country's first case of mad-cow disease (believed to cause fatal brain disorder in humans). Japan wants to import cows less than 21 months old, while the US insists cows less than 30 months old are safe from this disease.

>> The Burton coal mine near Mackay, in north Queensland, Australia, has had an uncontrolled release of contaminants from its storage facility. The release was contained but a quantity of the material still reached Anna Creek, which though dry presently, flows into the Isaac River. The Environmental Protection Agency is investigating the incident but no environmental change has been reported so far.

DROUGHT / ALBANIA

Dry dams bring darkness

Albania in southeastern Europe has imposed severe power cutbacks in the country. Drought and poorly maintained infrastructure threaten to bring electricity production to a halt in the country.

Electricity supply for general consumers are to be restricted to four to eight hours a day, said Korporata Elektro-energetike Shqiptare (KESH), the national electricity distribution company. KESH also said that cuts might exceed 15-16 hours a day in cities and would be even greater in villages. However, company officials added that



More dark days ahead

REUTERS

hospitals, bakeries, public institutions and embassies would continue to receive power.

This measure was imposed after a shortage of water virtually stopped

Albania's hydroelectric power plants, the country's only energy source. Talks were being held with neighbouring Greece and Serbia so as to transfer energy to Albania from other countries. ■

TOXIC WASTE / NIGERIA

E-waste from the West

A recent study conducted by Basel Action Network (BAN), a US-based lobby group, found that around 500 containers packed with old computers, televisions and mobile phones were arriving every month in



BASIL ACTION NETWORK

Poison in the gift

Lagos, Nigeria. These electronics come for repair and re-use but an estimated 75 per cent of it gets dumped at official land-fill sites or by roadsides and in swamps. "Residents breathing in the fumes from the fires or drawing water from contaminated areas are in danger," Jim Puckett, a BAN official, said.

BAN claims this export of useless electronics comes from the US and Europe and is illegal under the Basel Convention governing the international movement of toxic waste. ■

WATER / INDIA

Punjab ready to share water

The Punjab government on October 27, 2005, agreed to give the full share of 8.6 million acre feet (MAF) water from the Ravi-Beas river system to Rajasthan. Experts believe this could prevent acute water wars in the desert state. Earlier, Punjab agreed to release only 8 MAF water to Rajasthan, less than what is prescribed under the 1981 water-sharing agreement between the two states.

Punjab government does not wish to part with the water saying that the state required it for its own agricultural needs. But for Rajasthan, this water could bring about 0.12 million ha of land under irrigation facilities in the command area of Indira Gandhi Canal. Rajasthan said since Punjab was generating about 1,154 megawatt of power from the river system, they should be given half of this power as per the agreement. ■

CLIMATE CHANGE / AUSTRALIA

Australia not game for new post Kyoto limits

Australia's environment minister Ian Campbell recently commented that negotiating new greenhouse gas emission levels for the Kyoto Protocol was a waste of time. He felt most countries would fail to meet these targets and the upcoming November meeting in Montreal, on climate change, would be unfruitful.

Campbell accepted global warming is a threat but believed the solution lay in incentives for new and clean technology rather than penalising heavy polluters or forcing industries to cut emissions. He ruled out any Australia-based emission trading in the near future which would require caps on industries leading to job losses. He added that a global market in carbon trading should be part of the long-term global efforts to fight greenhouse gas. ■



Ian Campbell

ENERGY / SOUTH KOREA

Give us our nuclear dump

South Korean city of Kyongju has accepted to store nuclear dump in exchange for government subsidies worth us \$288.2 million and us \$5-10 million a year as storage fees.

Kyongju city won the vote to host the country's first permanent storage site for nuclear waste beating three other cities vying for it. About 90 per cent of city residents voted a "yes" in this regard since they are more interested in economic development than the impact on tourism and environment. "The government had restricted the development of the region for nearly 40 years due to the Cultural Properties Protection Law," says a local resident.

FARMING / GLOBAL

EU ministers clash on GMOs. Again

European Union (EU) farm ministers once again revealed their long-standing rift over genetically modified (GM) food. At a recent meet in Luxembourg, proposals to approve new GM imports and to ask Greece to lift its GM ban could not be passed.

All the GMOs under discussion are

maize types made by US biotech giant Monsanto. In such a deadlock, the European Commission gains legal power to approve a new GM product and, as in the case of Greece, to issue an order to an EU state to reverse a national measure. Greece banned GMO maize in the country in early 2005, under the EU law which provides for countries to decide whether to allow such seeds in the national territory. ■

POLLUTION / USA

From gas to oil, courtesy winter

Environment officials in Massachusetts, USA, are considering whether to let four gas-powered plants to switch to dirtier oil, 50 per cent more often, this winter. The state is focusing on these plants as they can switch between gas and oil.

Officials feel this move could stave off natural gas shortages and blackouts



More fumes in the offing

in winters. The state's department of environmental protection claims there would be 50 more tonnes of soot emission annually and an increase in smog. The impact on annual pollution might be negligible, but the effect of additional emissions would be felt near the plants' home communities, specially troubling asthma and lung disease patients. ■



GREEN TRANSPORT / BRITAIN

Hydrogen powered Microcab

A water-powered car named Microcab, running at 53 kilometers (km) per litre, has been created by John Jostins, senior lecturer of design and digital media at Coventry University, UK. The car, powered by a hydrogen cell, is seen as an environment friendly solution to inner-city motoring. The car has a capacity to hold four people and a top speed of around 42 km per hour. John hopes it would solve the problems of cost and harmful emissions. "Microcab is completely silent and its only emission is water vapour," said John. He hoped a series of countrywide pilot schemes would help refine the design. "How it takes off from there depends on whether petrol stations begin to offer hydrogen on their forecourts," he said. The fuel cell has been developed by Loughborough University, while the car has been designed and built in collaboration with Coventry University. ■

PAK INDUSTRIES CHECKED:

Punjab environment minister Makhdoom Ashfaq Ahmed announced recently that the Punjab environment protection department would hit hard on industries violating environmental norms. He said that the self-monitoring and reporting tools programme (to assess and report the volume of hazardous waste generated by industries) shall be implemented stringently. Earlier, since this was a voluntary programme, none of the violators were booked. "We will not spare the industries failing to get certified under ISO-9000 up to ISO-14000. The industries, especially those generating hazardous waste, will have to install plants to treat it, otherwise they would be closed," the environment minister added.



INDO-IRANIAN PIPELINE:

The US \$7.5-billion Iran-Pakistan-India gas pipeline project got a feasibility report prepared by the international financial consultants Ernst and Young, on October 28, 2005. This move could give the project more validity in international forums, as well as boost the confidence of all involved parties, believes a senior official of the Union ministry of petroleum. This is a run-up to the final framework proposal being signed by December 31, 2005. The 775 kilometre gas pipeline, often dubbed as "pipeline for peace", began in 1994 but tensions between Pakistan and India hindered its progress till January 2004. This delay escalated the cost of the project by at least US \$3 billion. Work on the project is expected to commence in 2007 and would take around three years to complete. India would buy 70 per cent of the gas while the remaining 30 per cent would go to Pakistan.

ENVIRONMENT POLICY / CHINA

Power and people

China plans to turn the Nu River in southwest Yunnan province with a chain of up to 13 hydropower stations, into a hydroelectric hub. The government's release of a five-year development plan draft gave rise to a debate about national priorities. It urged a halt to environmental destruction while still pushing for rapid economic growth.

The project is expected to take a decade or more to build and would generate more power than the gigantic

A future hydroelectric hub



KAREN RIVERWATCH

Three Gorges Dam. It would displace around 50,000 farmers. But supporters feel the dam would bring electricity and jobs to remote corners of China. Conversely, opponents say it will tear the region's delicate social and environmental fabric without benefitting the locals. To this effect they circulated a petition urging the government to release studies of the dams' environmental impact. However, officials have been reluctant to release these studies. ■

POLLUTION / PHILIPPINES

Greenpeace bungles, pays up

Greenpeace, a non-profit organisation, has apologised for the damage caused to 160 sq metre of coral reef by its ship *Rainbow Warrior II*, in Philippines, on October 31, 2005. The reef is a 32,000-hectare formation in the Sulu Sea in central Philippines that is listed by the UN Educational, Scientific and Cultural Organisation, as a world heritage site.

Greenpeace was fined nearly US \$7,000, for this damage. "This accident could have been avoided if the chart was



Rainbow Warrior missed its target

accurate. We feel responsible, however....," said a Greenpeace official. This visit was part of a trip to raise awareness about global warming and promote renewable energy. ■

WILDLIFE / THAILAND

Thai PM goes safari shopping

Thai prime minister Thaksin Shinawatra's recent pursuit of the controversial deal to stock a safari park in Thailand with African animals has again fueled a long standing controversy. Reportedly, up to 135 animals might be involved in exchange for Thai technical assistance. Also a donation of around US \$490,000 million for the animals has



Thaksin Shinawatra

been given by Thailand.

The swap arranged last year had attracted little notice until animal welfare campaigners got wind of the arrangement and protested. Activists claimed the animals were to be captured from national parks and wildlife reserves. Transferring animals from their natural habitat to zoos would affect their welfare and also hamper efforts to protect them while also damaging Kenya's tourism sector, they said. ■

FOREST / BRAZIL

Amazonian logging gang busted

Brazilian police recently arrested a gang of 35 people who forged thousands of logging permits and sold them to transport millions of dollars worth of hardwood timber in the Amazon. This operation is the fifth such operation since 2003.

Brazil's government claims that checks on illegal logging and tighter law enforcement has slowed deforestation in the Amazon by half this year.

Though environmentalists say much of this deforestation was due to a slump in farming. Brazil's environment minister advocates controlled use of the forest rather than banning logging outright. He said selective cutting should be done in a legal and organised fashion.



TRADE / AFRICA

REACH — Africa's bane

Thabo Mbeki, President, African National Congress, expressed his concerns to the EU regarding its Registration, Evaluation and Authorisation of Chemicals (REACH) legislation. REACH is designed to protect people and the environment from adverse effects of chemicals found in wide ranging products. REACH also covers metals, steel, alloys, waste and scrap material. As African nations heavily depend on mining, if REACH is passed in its present form people might suffer, feels Jerry Matjila, South African ambassador to the EU.

Mbeki fears REACH, which is applicable to metals and chemical substances would generate costs that would push African, Caribbean and Pacific states into further poverty. Under REACH, chemicals makers would have to register the properties of substances with a central EU database. ■

CANADA REFUSES SUMAS: The federal court of Canada ruled out the possibility of establishing a US-based power plant near the Canadian border. The company, Sumas Energy 2, proposed to source natural gas from Canada and build the plant in Sumas. It would cost US \$400 million and generate 660 megawatts of power. The proposal ran into opposition in the province's Fraser Valley, where communities contended that air quality was already bad because of pollution drifting from the Vancouver area. The National Energy Board rejected the proposed plant last spring.

VIOXX VERDICT: The New Jersey court recently gave a verdict in favour of the Merck & Co Inc. A case was filed by a 60-year old man claiming that the anti arthritic medicine Vioxx, of Merck, caused his heart attack. The court dismissed the case saying the man had been using the drug intermittently and had other health problems, which could have led to the heart attack. The verdict might protect Merck from a majority of the 6,500 lawsuits pending against Vioxx. These cases were filed after Merck voluntarily withdrew Vioxx from the market last year, as a study showed long-term use of this medicine could cause a heart attack.

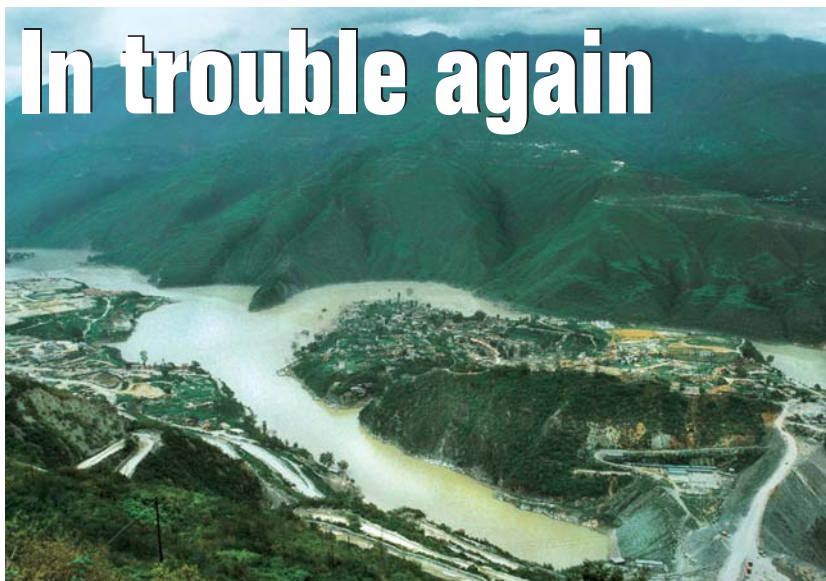


OIL / CENTRAL ASIA

Pipeline for peace

Environmentalists and non-governmental organisations (NGOs) in the Caspian region surrounding the Baku-Tbilisi-Ceyhan (BTC) pipeline have voiced concerns about the proposed route for the pipeline. Apprehensions were raised at various public hearing meetings and till the last meeting, regional activists remain concerned about the pipeline's ecological threat.

Various NGOs voiced their concerns at the hearing saying that the proposed pipeline route posed a threat to environmentally sensitive areas. They urged the BTC pipeline consortium to change the route to reduce the risk of an ecological catastrophe. ■



SURYA SEN/ CSE

In trouble again

Supreme Court issues notices against closure of final tunnels of Tehri dam; conditions unfulfilled

KUSHAL PAL SINGH YADAV

ON NOVEMBER 8, 2005, a three-judge bench of the Supreme Court (SC) issued notices in a case challenging the closure of the final diversion tunnel of the Tehri dam project, because mandatory conditions have not been met. The SC was hearing a petition filed by N D Jayal and Shekhar Singh. The notice demanded replies from the Union government, Uttaranchal state and the Tehri Hydro Development Corporation, within two weeks. The bench comprised Chief Justice Y K Sabharwal and justices C K Thakker and P K Balasubramanyan.

Non-compliance

The petition, while challenging the October 29, 2005, order of the Uttaranchal High Court, draws attention to issues concerning non-compliance of relief and rehabilitation measures by project authorities before they closed down tunnel T-2. This closure will gradually lead to filling up of the dam reservoir. In its judgment, the high court had lifted a 53-day long stay on the closure of T-2. "In its September 1, 2003, judgment, the SC had made it clear that clearance to the dam was conditional to several mandatory environmental and other conditions being met," says Sanjay Parikh, advocate for the petitioners. Environmental conditions included setting up of the

Bhagirathi Basin Management authority, catchment area treatment, command area development, flora, fauna, water quality management, disaster management plans and relief and rehabilitation. "Most of these conditions have not been met," says Parikh.

Requirements not met

After the state of Uttaranchal was formed, the case was transferred to its high court for monitoring that conditions were being met before the diversion tunnels T-1 and T-2 are closed down. Two different committees were entrusted with the task of monitoring and reporting. "Both these committees had reported that mandatory conditions are not being met," says Parikh.

Despite this, T-1 was closed in January 2004 and in October authorities pressed a claim to shut down T-2 as well, saying all conditions had been fulfilled. "Closure of T-2 is in complete violation of the SC order," says Parikh. For instance, the command area (CA) development involves planning the impounded water will be distributed in the CA and also the means to do so. And CA development is imperative before impoundment begins. The project authorities submitted the CA treatment plan only in

January 2005, which awaits clearance by the ministry of environment and forests. Another condition was the construction of a water monitoring station before the submergence but this has also not been done.

Incomplete measures

The petitioners have complained that the relief and rehabilitation process is also far from complete. "In several villages neither the land acquisition process has been completed nor rehabilitation sites been developed. Basic civic amenities like primary health centre, schools, irrigation, drinking water, roads and electricity are incomplete in all new rehabilitation sites," says Vimal of Matu People's Organisation, a non-governmental organisation working with dam oustees.

On October 29, 2005, T-2 was closed down amidst heavy police protection. The reservoir will take about three years to completely fill up. Once filled, the reservoir will submerge old Tehri town, 37 villages completely and 72 villages partially. Till August last year, most of the villagers of Malidewal, the first large village to be submerged, had not left the village due to inadequate rehabilitation measures. Villagers have been averse to leaving the hills and resettling on the land allocated in Pashulok in the Terai region. "In many villages, people have not yet constructed a house at the rehabilitation site. Closure of T-2 will drown these villages and force villagers to move

to the rehabilitation site with whatever little they receive," says Vimal. Even in the old Tehri town, about to drown completely within a few days, a few people were still left.

The water level in the Bhagirathi, downstream of Tehri, has drastically reduced and the river is nothing but a small stream

In the September 1 judgment, the court made it clear that clearance to the dam was subject to several mandatory environmental conditions

now. The most visible impact of this is found at Devprayag, where Bhagirathi and Alaknanda meet to form the Ganga. Disappearance of one of the rivers at the confluence is indeed a strange spectacle for the pilgrims and local people. "This would ruin the local economy of the town which is completely dependent on pilgrims who come to take a dip at the holy confluence," says Vimal. ■

The axe effect

Orissa lifts a ban on tree felling; faces logic crunch

RUKSAN BOSE

THE government of Orissa lifted a 1992 ban on felling of trees in 11 of its 50 forest divisions in September this year. "The move was not based on any scientific assessment. The forest department (FD) has not analysed the impact of the ban," says B B Pandey of the Regional Centre for Development Cooperation (RCDC), a non-governmental organisation, in Bhubaneswar. RCDC held a public meeting on November 7, 2005, to discuss the lifting of the ban.

Even foresters agree that the FD does not have the resources to monitor felling according to working plan (WP) requirements (WPs chalk out land for felling and the procedures governing them). The state's FD is short of staff; 40 per cent forest guard posts are vacant.

"The working plans for 11 divisions have been approved by the Union ministry of environment and forest," says Bhagirathi Behera, director (operation), Orissa Forest Development Corporation (OFDC). According to him only a restricted number of trees will be cut, especially old and mature trees, which will otherwise rot and lose their timber value.

Officials say if officers are present in forests for felling operations, illegal logging will be reduced. "But isn't it the job of the FD to be present and prevent smuggling anyway?" asks Pandey.

Y Giri Rao of the NGO Vasundhara, who has studied the WPs, says, "They are revisions of decades-old British era ones. Decisions about current forest density are based on biomass studies done only on sample patches of 8-10 hectares." A WP is also supposed to adjust the annual yield against illegal removal and natural loss. According to Pandey, only one of the plans takes this into account. He adds, "This means felling will be done over and above what has already been lost." Unscheduled felling due to diversion of forestland for



SURYA SEN / CSE

This green cover may soon disappear

mining projects — 43 new steel plants are proposed in the state — is not deducted from the total that can be felled, he says.

The Orissa Jangal Manch (OJM) — comprising members of district federations of community forest protection groups — has been the strongest opponent of this move. Community groups have been protecting forests, some for over 10-15 years, often by restricting their own needs. "There have been cases of conflicts leading to bloodshed when outsiders have tried to cut trees. Lifting the ban will open the forests to the timber mafia and increase conflict between villages," says Sudarshan Chotroy, a local journalist.

Under joint forest management agreements, the FD is supposed to give community groups — *vana surakhsha samitis* — 50 per cent share of the revenue. "Even if some of these groups allow cutting, the FD would never give them their share," Chotroy says.

Revenues of the FD have been falling since the ban. Since 2002, a mere 3.46 per cent of the 10th Plan funds have

gone to forestry and wildlife — the need for generating revenues through felling is increasing. But a state that has spent the last decade telling forest-dependant communities to protect forests, will find it difficult to convince them of the logic of cutting trees now. ■

Autonomy issue

ICMR needs funds and teeth

VIBHA VARSHNEY

A REPORT by an appraisal committee identifies lack of autonomy as a major reason for poor performance of Indian Council of Medical Research (ICMR), the premier government body in charge of medical research in the country. The committee suggests the organisation would be better equipped to address new health threats if it's made an independent department under the Union ministry of health and family welfare (MOHFW). The committee was formed at the behest of the Planning Commission when ICMR demanded more funds for research at a recent expenditure finance committee meet.

The committee submitted its report to the Union health minister on October 17, 2005. If ICMR is made into a full-fledged department, it would have func-

UNION PANGS

The European system of reciprocal health and social welfare cover between countries is turning out to be a serious financial drain on Spain's economy. The country has protested against the rising cost of providing healthcare to 225,000 Britons, who have settled there. Most of the beneficiaries are pensioners from the UK, who've retired in Spain, as it affords quality health facilities and pleasant weather. Spain claims that only 49,436 Britons have completed the E-121 form necessary for availing health facilities under reciprocal terms. In case of such clients, governments within the EU reclaim a share of the healthcare costs from the patient's home countries. The remaining 175,000 people avail healthcare services budgeted solely by Spain.

Spanish authorities face soaring bills for

SURYA SEN / CSE

**Indian Council of Medical Research**

tional autonomy preventing delays in research. Currently, ICMR is among the many institutes under the MOHFW and is controlled by a joint secretary. Lack of autonomy and scant funds have also resulted in good researchers not joining it. "We don't have many researchers from the medical professional now; this affects research quality," says an ICMR official. The minister is yet to decide on the recommendations. ■

Label heavy metal

Herbal products for exports will have carry additional info

VIBHA VARSHNEY

THE department of *ayurveda*, *yoga*, *unani*, *siddha* and homeopathy (AYUSH) under the Union ministry of health and family welfare (MOHFW) recently issued a notification making it mandatory for

manufacturers of herbal products to mention on containers that the amount of heavy metals is 'under permissible limits'. The MOHFW said that environmental pollution and unsatisfactory agricultural and collection practices in medicinal plants lead to high levels of heavy metals in products. The notification will come into effect from January 1, 2006.

This notification came after a controversy regarding high level of heavy metals in Indian traditional medicines in the international market. Interestingly, this controversy pertains to the presence of heavy metals in products that are not purely herbal, but those in which heavy metals have been added deliberately to enhance their medicinal value. But the notification deals only with purely herbal products, being exported from the country as dietary supplements.

The notification directs manufacturers to certify that heavy metals such as arsenic, lead, mercury and cadmium are within the limits set by the World Health Organisation. Manufacturers who do not have in-house laboratory facilities, will have to get these approved by a

AYUSH's notification deals only with purely herbal products and not those in which heavy metals are being added deliberately

drug-testing laboratory.

But manufacturers feel this notification might reduce exports rather than increase them. "It would be very difficult to make heavy metal free products as the raw materials are themselves contaminated. And once these products are off the shelf in the international market, it might be difficult to reintroduce them," says a manufacturer. This step would not help in making the traditional systems of medicine acceptable in industrialised countries. So experts feel, instead, protocols to assess the safety of products containing heavy metals would be more relevant.

The notification at present is applicable only to exports, leaving the Indian consumer at risk. Also, even if manufacturers get their products tested, there is no authority to test whether they are complying with the standards. ■

Safety call

Expert committee set for Mullaperiyar dam

T V JAYAN

AT A hearing on November 10, 2005, the Supreme Court (SC) suggested that an expert committee be set up to probe technical and safety issues relating to the height of the Mullaperiyar dam — the subject of a 25-year long dispute between Kerala and Tamil Nadu (TN).

A three-member division bench of the apex court, comprising Chief Justice Y K Sabharwal and justices C K Thakker and P K Balasubramanyan, put forward the suggestion to the counsels of the TN and Kerala governments.

Though the dam is situated inside the Periyar Tiger Reserve, Kerala, it does not get to use the waters which had been leased out to TN for 999 years in 1886 during colonial rule. Though the deal was revalidated in 1970 by an inter-state agreement, Kerala once again failed to protect its interests (see 'Water war', *Down To Earth*, November 30, 2001).

Increasing the water level in the dam has been a controversial issue. TN wants the water level in the reservoir of the dam to be increased to 43.28 metres. Kerala feels it would be dangerous for the safety of the dam, which has been leaking since 1930. TN also argues that this decision was as per the Central Water Commission's recommendations. The commission suggested that the water level could be increased to 43.28 metres once measures to strengthen the dam are taken. However, Kerala



counters saying the reservoir height cannot be increased as it falls within a seismic area and will submerge around 1,620 hectares of forestland in the Periyar sanctuary. ■

UK patients flood Spain's free healthcare

drugs, nursing and homecare for expatriates. Acute hospital care costs Spain an extra US \$70 million a year. The Spanish taxpayer has to bear most of this. Lodging a strong protest, Elena Salgado, Spanish health minister, has opened talks in Brussels on obtaining due reimbursement from the UK. "We have opened the door to everybody and it needs to be regulated," said Cristina Gutierrez-Cortines, member of parliament (MP) from Murcia, a favoured destination for Britons.

One million UK citizens own property in Spain, says a healthcare study. The Spanish say many assume the healthcare system in Spain for the old is similar to that in other European countries but fail to realise that families help look after the elderly in Spain, supplementing professional care, thereby lowering the cost.

Kudremukh closure

SC directs KIOCL to shut mining operations

THE Supreme Court (SC) once again directed Kudremukh Iron Ore Company Ltd (KIOCL) to shut down all mining activities by December 31, 2005. This is a major triumph for environmentalists who have been working for years to protect the fragile hill ecology of Kudremukh in the Western Ghats in Karnataka. The apex court took this tough stand against the iron ore major on September 30, 2005, while reacting to a request of the company for a delayed closure. The court now insists on a closure before any further hearing.

In the meantime, the company has prepared a closure plan, which, incidentally, calls for further mining by targeting 54 hectares of virgin area in the Kudremukh national reserve. KIOCL claims this is the only way slope stability in the region can be ensured.

The Supreme Court insists that KIOCL has to shut its mining operation in Kudremukh by the end of the year

Interestingly, the Indian Bureau of Mines has also approved this plan and has submitted it to the Union ministry of environment and forest. However, environmentalists are not convinced. The company's plea for an early hearing on the need to ensure slope stability and the social factors involved in stopping operations has not helped. The original SC decision was taken three years ago, on October 30, 2002, when a three-judge bench of the SC comprising the then Chief Justice B N Kirpal, justices Y K Sabharwal and Arijit Pasayat, ordered all mining operations to cease. They stuck to the order, saying the company has to stop operations by December 2005.

The company was given a mining lease for 30 years in 1969. Further Kudremukh's biodiversity wealth had almost earned it a national park notification in 1987. So, for all reasons, environmentalists were all set to see the Kudremukh hills free from any pollution. But in 1999, even when the lease

expired, mining continued. Displeased, K M Chinnappa, a retired forest officer and trustee of the non-governmental organisation Wildlife First, filed an interlocutory application with the SC in 2001. This was in the Godavarman Thirumalpad vs Union of India case. Chinnappa appealed for the mines to be closed and the leased areas to be included in the national park.

The company fought the case in the apex court for almost two years. But the petitioners produced evidence establishing lasting damage not only to environment of the Kudremukh region, but also to the Bhadra river and reservoirs and to agricultural land downstream.

The company, given a mini-ratna stature, has the largest mining and pelletisation complex in the country and has a turnover above Rs 1,800 crore. Lawyers like Kapil Sibal (currently minister of science and technology) and K K Venugopal have at different times represented the company. ■

Beginning a new term

Terminator technology patent holder enters the Indian market

SOURAV MISHRA

THE burgeoning Indian seed industry saw a new entrant on October 22, 2005 — Deltapine India Seeds Private Ltd (DISPL) — a wholly owned subsidiary of the US-based Delta & Pine Land Company (D&PL). The industry has hailed the plans of the world's largest cottonseed company to establish a commercial breeding programme in Punjab. But civil society organisations and many farmers' groups are not happy. Reason being D&PL holds multiple patents for the controversial 'terminator technology' (TT).

Leading farmer body Bharat Krishak Samaj has strongly objected to it, as it could threaten the poor farmers' control over seeds. TT is also known as genetic use restriction technology (GURT), which refers to a switch mechanism that controls the reproductive capability in plants. This makes the seed viable for only one season. It has serious implications in the Indian context as more than 70 per cent of the farmers use farm saved seeds.

G S Gill, country manager, DISPL, informed *Down To Earth* that the company is not working on terminator seeds in India and has also not applied for any patent in the country. Moreover, the Seeds Bill, 2004, which is

with the Parliamentary Standing Committee on Agriculture, prohibits the use of TT. But farmers doubt the motive of the company. This also makes the Indian government's own stand on TT rather ambiguous as on the one hand it rejects the technology overt-



SHYAMAL

ly while on the other it permits the inventors and patent holders a smooth passage in the country.

DISPL is focusing its activities on the three main cotton-growing regions of north, south and central India. "India, being a large potential market for cotton seeds, has an important place in D&PL global marketing strategy," says Gill.

D&PL and the US department of agriculture are the only owners of the original prototype terminator patent. ■

Mobile danger

NGO suggests cellphone safety measures

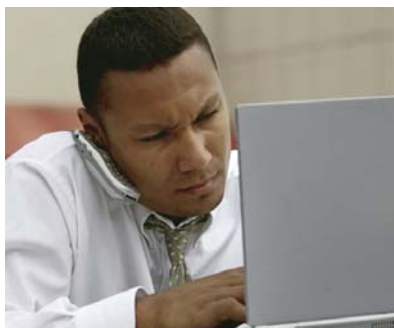
VIBHA VARSHNEY

A MEETING was organised to discuss the urgent need to regulate radiofrequency field (RF) levels of mobile phones in India. The meeting was organised on October 25, 2005, by International Telecommunication Union — Asia Pacific Telecommunity Foundation of India, a non-government organisation. It had representatives from the mobile phone industry, service providers, scientists and policy-makers.

A large number of cases have been filed against the mobile industry in industrialised countries. These have argued RF has various deleterious effects including cancer and psychological problems. Consequently, the Indian mobile industry wants to protect itself. Currently there are around 115 million users in India.

Although the effect of RF on health has been studied for the last 50 years, it has not been directly linked to any disease. But since doubts remain, international bodies like World Health Organisation and others are carrying out further studies.

Industry representatives claim that the cell phones in the market are safe at present. The situation might change if substandard sets from small manufacturers enter the market. The towers of service providers have also been implicated in emitting RF. While the existing towers have been manufactured outside India and their quality meets interna-



tional standards, they are now being made indigenously and there is need to set quality checks.

The International Commission on Non-Ionising Radiation Protection has prepared guidelines on RF emissions and the mobile industry requests countries to implement them. In the meeting, industry representatives suggested that these international guidelines should be followed in India too. There is an ongoing debate about the effectiveness of these guidelines.

So far, no studies have been carried out in India to find out the extent of RF exposure. The government urgently needs to validate these results independently. Shakeel Ahmed, minister of state for communications and IT, said that he would ensure that such studies were immediately conducted.

The recommendation is soon to be submitted to the government for further consideration. With new mobile technologies hitting the market, this regulation is the need of the hour. ■

IN SHORT

► **TOBACCO OFF THE SHELF:** Thailand has taken a strong step against tobacco sales in the country. They ordered vendors in September to remove all cigarettes from display or risk a US \$50,000 fine. Activists say cigarette packets are also effectively an advertisement and so should be hidden from view.

SA FOR TOTAL ASBESTOS BAN: South Africa has finally decided to ban asbestos completely, from a wide range of day-to-day buildings, piping and motor car products to protect public health. A draft regulation in this regard was published in the Government Gazette on October 4, 2005.

AMAZONIAN DROUGHT: Thousands of Brazilians across seven states, surrounding Manaquiri lake in the Amazon region, have been hit this year by the worst drought in four decades. The drought, meteorologists say, is the result of warmer ocean water, which is also to blame for one of the most violent hurricane seasons on record around the Gulf of Mexico.

LEAD PAINT LAWSUIT: Rhode Island has sued four lead-based paint makers a second time for endangering the health of children and contaminating thousands of homes. The companies called the lawsuit unfair and say they are being targeted for a problem they didn't create.

China's green star

Party goes for 'Green GDP'

THE Chinese government finally decided to move to an alternative growth trail based on a 'green Gross Domestic Product (GDP)', says an October 2, 2005 Inter Press Service Agency report. The Communist Party of China recently unveiled a draft blueprint for the country's economic development in the next five years, which stressed the need for

the conservation of natural resources and adoption of 'green GDP'. The proposed 'green GDP' will calculate economic growth only after considering the cost of environmental impact and resource consumption. The country is aiming to achieve this green growth by making local leaders accountable for the use of resources and pollution.

Alarmed over the deteriorating state of China's environment, the government has determined that it wants the national economy to not only grow fast,



but grow green too. This also reflects China's concern about its environmental image with the Beijing Olympics approaching.

Environmentalists believe pollution levels in China could quadruple within 15 years if the country doesn't curb its rapid growth in energy consumption. China's emissions of sulfur dioxide were the highest in the world last year. They caused acid rain across 30 per cent of the country, as a report released by the State Environmental Protection Agency stated recently. ■

FOWL PLAY

Is an avian flu pandemic imminent? As panic sends the world into a flutter, the Indian response still struggles to take wing, discover

PADMAPARNA GHOSH and T V JAYAN



The guns are drawn, the coffers are stocked and international border security tightened. The preparations portend a global disaster — a possible pandemic as the avian influenza ominously overruns countries. A blitzkrieg of media reports and press releases by international animal and human health organisations push the panic button. Estimates of death toll and economic loss are running out of zeroes.

The globe's feathers are ruffled, prompting astronomical flu funds and a mad scramble to stock drugs and vaccines.

US President George Bush has announced a US \$7.1 billion flu plan, which even involves deploying troops. Of the massive flu fund, US \$1.5 billion are earmarked to develop an experimental vaccine and US \$1 billion to buy two antiviral drugs — Tamiflu (oseltamivir) and Relenza (zanamivir).

The whole spectre of a global catastrophe is created on one premise: a potential mutation in the virus that might enable it to jump from human to human. But as of now, only cases of bird-to-human transfer have been reported; not a single case of human-to-human transfer of an avian influenza virus is known (see box: *Human risk*).

Shaky foundation

Proponents of a bird flu pandemic untiringly cite the catastrophic Spanish flu of 1918, which killed 20-30 million people in Europe, South America and the US. But numerous studies have indicated that the 1918 strain didn't have an avian origin. Jeffery K Taubenberger of

the Armed Forces Institute of Pathology in the US, one of the foremost researchers on the 1918 pandemic, reconstructed the virus from excavated bodies and compared its genetic constitution with that of birds captured in 1918. His conclusion: the extremely pathogenic virus did not acquire its genetic material directly from a bird (*Journal of Virology*, Vol 76, No 15, August, 2002).

Having claimed 68 human lives since December 2003, avian flu is being seen as a gigantic killer. But a pandemic is possible only if the virus mutates and starts spreading from human to human. Recently, the World Health Organization (WHO) pegged a possible avian flu human toll at a dramatic maximum of 150 million people, but soon scaled it down to 7.4 million. The World Bank has quoted US \$800 billion as the possible loss from avian flu to the global economy and promised US \$1 billion to combat it.

The only number that appears insignificant under the circumstances is the actual death toll of a mere 68 (see box: *Who will make a killing?*).

The virus strain behind the fatalities is referred to as H5N1. It is the only avian influenza virus to have claimed human lives since 1980. Scientists say because of the extremely versatile nature of influenza viruses, it is difficult to determine which avian flu strain may

jump to humans. Between 1980 and 1997, there have been four recorded outbreaks of avian viruses that were highly pathogenic to birds. The first of these occurred — not in Asia,

Aavian flu is being touted as a gigantic killer. Till date, it has claimed a total of just 68 human lives



RUHANI KAUR / CSE

Who will make a killing?

Tamiflu or the virus

The World Health Organization recommends countries should stock enough Tamiflu (one of the two antiviral medicines for avian influenza) for a quarter of their population to ward off a possible outbreak. At a cost of US \$60 per course of medication, this means the total spending could touch US \$100 billion.

With global spending on the drug shooting through the roof, Swiss firm Roche AG, the sole maker of Tamiflu, has refused to grant licences to other drug producers, inviting sharp criticism. The recent strife between Roche and Cipla prompted India to allow compulsory licensing in the country. This means that companies can manufacture the drug but cannot export to other countries (see 'Roche relents', *Down To Earth*, Vol 14, No 12).

Gilead Science Inc. (GILD), US, invented the drug in 1996 and sold all commercial and manufacturing rights to Roche. But GILD still receives 10 per cent royalty on all Tamiflu sales. Thanks to the flu scare, Roche's sales saw a meteoric rise from US \$76 million in 2001 to an estimated US \$700 million this year. In the whole chaos, adding to the vaccine manufacturers' windfall, Bush has also renewed his call for liability reform that would shield vaccine makers from lawsuits from consumers.

Forty countries are stocking Tamiflu. The US, the UK and Japan together will have about 24 million doses by early 2006. Tamiflu has an expiry period of three years.

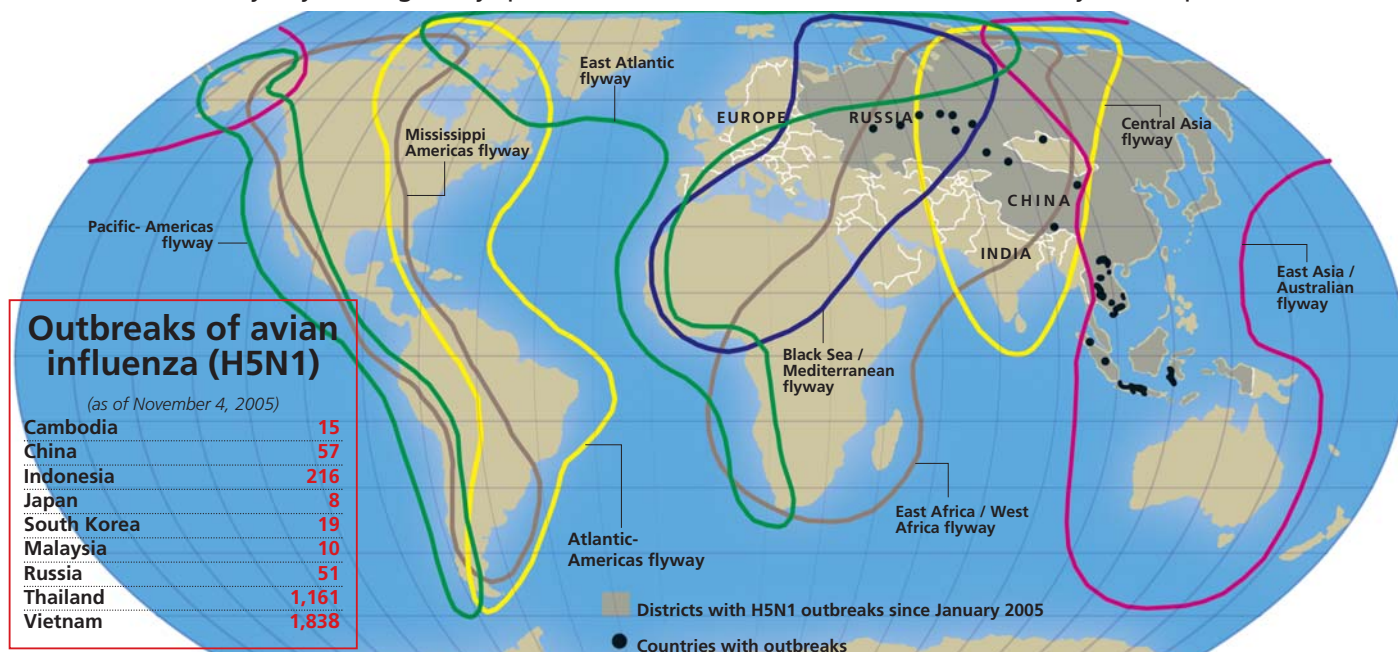
but in the US — in 1983 and involved the strain H5N3, according to the US-based Centers for Disease Control. But none of the four outbreaks affected humans.

According to Peter Palese, a microbiologist at the Mount Sinai School of Medicine, New York, the threat from H5N1 flu virus is a false alarm. Studies of blood samples collected in

1992 from people in rural China indicate that millions of people had developed antibodies to the H5N1 strain. This implied that they had recovered from the infection without any apparent ailment. Moreover, the H5N1 avian flu strain has been circulating in China for almost a decade without any reported incidence of a human-to-human transmission.

Missing link

Flyways of migratory species and outbreaks of avian flu do not always overlap



Red herring

Migratory birds may not be main carriers

For almost two years, between 2003–2005, the avian flu was restricted mostly to China and southeast Asia. Several flu outbreaks were reported in poultry, domestic ducks and geese in Cambodia, Indonesia, Thailand, Vietnam and other countries, resulting in culling of over 140 million birds. Then, in May 2005, over 6,000 birds reportedly died at Qinghai Lake, in northwest China as the virus spread into Mongolia, Russia, Croatia, Romania and Kazakhstan. This set alarm bells ringing all over the world.

The reasons for the spread of the flu are still being hotly debated. Though poultry trade and illegal wild bird trade are seen as possible conduits, the migratory birds are portrayed as the primary carriers of the flu virus. There are two flyways (pre-determined paths, in specific seasons) that the birds use to migrate between south and southeast Asia, Western Siberia and Eastern Europe. It is inferred that these are the regions getting affected.

International conservation organisations, like Wetlands International and Birdlife International, are aghast at the charge against migratory birds. The spring migration occurs during April–May, while the first sign of an outbreak, outside China, was seen at the end of July. “The migratory patterns of the (supposed) carriers and the seasons do not match up with the outbreak time-table. Moreover, the infected ducks die within two days and would not be able to fly over long distances,” explains Gopi Sundar, a researcher with the International Crane Foundation’s Delhi centre. “Even the outbreaks in Croatia and Romania in migratory birds have been

With the virus doing the rounds of southeast Asia since 1997, why has it struck the migratory birds now

self-limiting, which means that the infected birds died quickly, without spreading the disease,” he adds.

Moreover, some scientists ask, with the virus doing the rounds of southeast Asia since 1997, why has it struck the migratory birds now?

Evidence against migratory birds being the primary carriers of the virus also comes from the World Organisation for Animal Health (OIE), based in Paris. Its study on the avian influenza outbreak in Russia concluded the strain was different from that found in Qinghai Lake, rubbing the theory of wild birds carrying the virus to Russia. Says Sundar, “Till now, there has been no confirmed record of transfer of the virus from migratory birds to poultry. Rather, it is the other way round.”

The OIE report also determined that migratory species contracted the virus from waterfowl in lakes located close to the affected premises. The report suggested that if the H5N1 virus behaved as a low pathogenic strain in wild ducks, it could have persisted at a low endemic level in the breeding population. The local concentration of birds during July for annual moulting and the presence of juveniles might have amplified and spread the virus.

Meanwhile, the flu scare has prompted several countries to impose restrictions on poultry imports. The US, the biggest exporter (2.47 million tonnes in 2004), is suffering as Russia, the biggest poultry importer, along with China and South Korea have put a ban on poultry imports. Critics of the migratory bird-viral flu theory claim it is being used as a red herring to take attention away from the more imminent threat from poultry trade — legal or illegal.

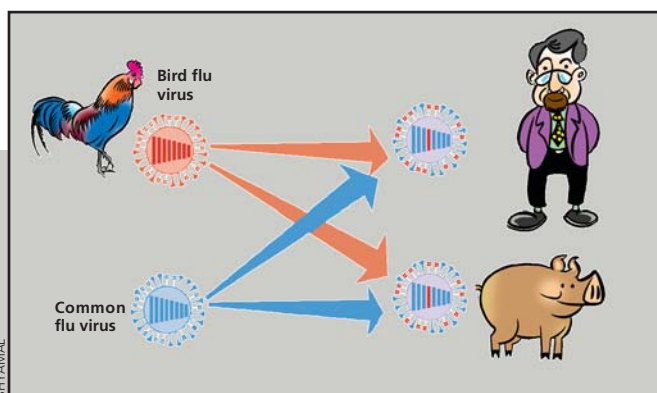
Human risk

From avian influenza viruses

All avian influenza (AI) viruses belong to Type A influenza in the Orthomyxoviridae family. Type A viruses are divided into subtypes based on two proteins — hemagglutinin (H) and neuraminidase (N). Their combination can produce up to 144 strains of the virus. H5N1 is one of them.

All AI viruses are either low-pathogenic or high-pathogenic. Two common strains, H5 and H7, are found both in low-pathogenic and high-pathogenic forms, whereas the H9 strain, which has been causing outbreaks in poultry farms across India since 2003, is considered low-pathogenic.

Scientists fear that AI strains to which humans have not been exposed may undergo genetic changes, enabling them to cross the species barrier and infect humans. If both AI and human influenza viruses are simultaneously present in a human being, there are chances that they mingle and



create a new strain. Pigs can also host both human and avian flu viruses, creating conditions for a new strain to develop. A species jump by the virus and subsequent, potential human-to-human transmission could be disastrous.

The World Health Organization divides a pandemic into six phases, ranging from minimal risk of an outbreak to a full-scale pandemic. It has classified the current situation at Phase 3. This means that human infections of a new subtype have occurred but there is little evidence of sustained human-to-human transmission.

Shortsighted

Government and industry found wanting

Despite being located within two flyways, India stands out like an island on the map of avian influenza (AI) outbreaks. "Not a single case of high pathogenic AI has been reported," says S K Bandyopadhyay, commissioner, department of animal husbandry and dairying (DAHD).

An estimated 5-20 million migratory birds visit Indian wetlands between October and March each year. This October, several wild birds that flew to Kulik sanctuary in West Bengal, died. While the official toll was 40, unofficial reports pegged it at 1,000. But Bandyopadhyay claimed the samples of dead birds sent to the High Security Animal Disease Laboratory in Bhopal were found free of H5N1 AI virus.

Since 2003, H5N1 has been found in only 11 migratory species, such as the bar-headed geese and red-footed falcons, all of which visit India. Many of these birds also visit China's Qinghai Lake, where an H5N1 outbreak occurred in May, 2005.

Backyard poultry

Taking advantage of the fact that this virus is predominant right now only in Asia, the US Poultry and Egg Export Council recently called for a complete shutdown of Asia's backyard poultry. But this sector provides livelihood to the poorest sections of the continent.

In India, the unorganised backyard poultry sector accounts for a significant 30 per cent of the production, according to the 2003-2004 DAHD annual report. An estimated 3 million people make a living from poultry.

However, it is the factious organised poultry industry that influences policy. The sector is highly polarised and policy shift often favours one or the other camp, sources say. After the avian flu outbreak in 2003, the government imposed a blanket ban on imports of seed materials and vaccines. Many saw the ban, lifted six months later, as helping one powerful lobby in the industry against another (see box: *Layered industry*).

Another problem is the secrecy that plagues management of poultry diseases. An example is the low-pathogenic avian influenza, fatal only to birds, that afflicted several farms recently. While scientists and senior officials in DAHD confirmed the presence of the virus, the industry vehemently denied its existence. "There is no low or high pathogenic strain of avian flu in India," asserts Anuradha Desai, chairperson of the Pune-based Venkateshwara Hatcheries, the country's biggest poultry firm.

A common practice in Indian poultry is for farm owners to make autogenous vaccines (produced crudely by purifying blood from infected birds) and sell them to small farmers. "Such vaccines are dangerous because they involve the risk of spread of other diseases from one farm to another. Moreover, the sector is utterly unregulated," says Shabbir Ahmad Khan, vice president, Poultry Federation of India.

A case in point is the export of vaccines against Ranikhet disease to Bangladesh. In February this year, a copy of a lab report secured by *Down to Earth* showed the vaccine, from a Gujarat-based firm, also contained killed strains of the low-pathogenic AI virus. This prompted Bangladesh to ban import of all Indian poultry products, says A T Venugopal, former director of the Poultry Diseases Research Centre of the Tamil Nadu Agricultural University. The case also revealed the presence of low-pathogenic AI virus in India.

Action plan

The need for India to be vigilant becomes imperative in view of its Rs 32,000 crore poultry industry, ranked fifth in the world.

The AI threat prompted the Union ministries of agriculture, environment and forest (MOEF), and health to draft an action plan in August, 2005.

The plan focuses on close monitoring of migratory birds flocking to protected wetlands and poultry. For this, MOEF is working with the Wildlife Institute of India, Dehradun and non-governmental organisations (NGOs) such as the Bombay Natural History Society. NGOs have identified 173 sites where migratory birds gather. Expert groups will be formed to collect samples. The birds will also be monitored through ringing, colour marking and satellite tracking.

"Every month, we now collect about 100 blood samples from waterfowl," says Subrata Biswas, secretary, department of animal husbandry, Kerala. But he also reveals that the results of random samples take an interminable 15-21 days to reach the department. Such a delay defeats the whole purpose of random sampling. In comparison, "the Australian government takes just four hours to report the results," says Venugopal.

Better monitoring

In states where backyard poultry is popular, such as West Bengal and Kerala (80 per cent of their poultry is unorganised), villages usually border wetlands. In such a scenario, it is crucial to ensure poultry and migratory birds don't interact, says Sundar. "According to our draft action plan, we will be monitoring bird population and surrounding poultry mainly in wetlands declared as protected under the Wildlife (Protection) Act, 1972," says P M A Hakeem, secretary,



AMIT SHANKER / CSE

Backyard poultry, the backbone for three million people in India, will be hit the hardest

Layered industry

A few big poultry firms call the shots

The Indian poultry industry is deeply segmented. With an annual growth rate of 15 per cent, the industry ranges from big players using modern hatching and rearing techniques to small farmers who raise minuscule stocks in traditional manner.

Pune-based Venkateshwara Hatcheries, which has about 60 per cent market share, is the market leader. The organised sector was detached from the poultry farms in the hinterland, till Coimbatore-based Suguna Poultry Group introduced in the late 1980s the concept of 'integration' — individual farm owners are given chicks, feed and medicines for rearing and mature birds are bought back about two months later.

The scare of an avian influenza outbreak in 2003 led to a significant drop in chicken consumption, forcing farmers to resort to distress sales. The prices shot up subsequently, benefiting only the big players, who had enough stock left.

The government's hasty decision to impose a blanket ban on import of grandparent stock (used for hatching chicks) in February 2004, made things worse for the small farmers. Most poultry hatcheries import stock 2-3 times a year. The second-generation birds hatched from this stock are then sold to individual small poultry farmers. Because of the ban, lasting six months, thousands of small farmers had to buy the chicks at a much higher price from hatcheries.

DAHD. However, Sundar argues that these large protected wetlands are relatively free of domestic poultry — it is crucial to monitor the less-known wetlands, where the poultry freely mixes with wild birds and the country's huge backyard poultry population. But Bandyopadhyay admits, only a few samples are taken from backyard poultry.

Besides, the government's estimate of the country's wetland area seems rather low. The Coimbatore-based Salim Ali Centre for Ornithology and Natural History (SACON), in its report, *Inland Wetlands of India*, has mapped seven million hectare (ha) of wetlands. But, the same report claims MOEF acknowledges a mere 4.1 million ha of these. In Kerala, for instance, the state government has identified just 12-15 wetland areas for surveillance, whereas SACON estimates the state has 64. MOEF has sent a list of wetlands to be monitored to DAHD but Bandyopadhyay refused to disclose it.

At present, the monitoring system in India is awfully inadequate. "The only bird counts are done by volunteer networks, which are grossly inadequate. For example, Jammu and Kashmir has a lot of wetlands but there is no network there. As of now, the only official bird counts are for major areas such as Bharatpur or Pong Dam," says Rahul Kaul of the Wildlife Trust of India. Bandyopadhyay admits that the government has no official figure on migratory birds.

Kaul says the "real" implementation of the action plan was yet to be seen at the grassroot level. "The awareness has to percolate down to the lowest level but apparently not much is being done," he adds.

Bird's eye

Avian flu might be overrated

Almost a century has passed since the 1918 Spanish flu. In the interim, a sea change has occurred in science, health care, public awareness and international co-operation. "Even if the virus were to mutate to a more virulent form, the world is in a better position to fight it now. We just have to be prepared enough," says Khan.

While comparing the current bout of bird flu with the 1918 outbreak, two other pandemic influenza events after 1918 are forgotten — in 1957-1958, in the US and in 1968-1969 in Hong Kong — which claimed only 0.002 per cent of the toll taken by the 1918 outbreak. Therefore, the current estimates of a possible toll may be way off the mark.

Whether the avian flu scare is well-founded or not, companies producing antiviral drugs and vaccines are enjoying a windfall and the factions in the domestic poultry industry slug it out for market control.

If all countries were to stock antiviral drugs even for a quarter of their population, as WHO recommends, it would mean a US \$100 billion business for the firms.

The big players seek to play down the disease load of the birds ostensibly for not "upsetting" the export prospects. "We don't want the industry to suffer like last year. We want to avoid an industry crash," says Hakeem. What is ironic is that India's poultry products export is just Rs 100 crore, or about 0.3 per cent of the country's poultry production.

Ultimately, it is the farmers engaged in backyard poultry who suffer most. They have to contend with heavier tolls than their organised counterparts, which though few, have come to represent the entire industry and wield considerable influence over state policies.

The government should ensure the current scenario in the poultry industry does not hurt smaller

farmers and companies, like last year when import of seed material (grand parent stock) and vaccines was banned. The measure had raised the cost of production, adversely affecting smaller farmers and laying golden eggs for the larger ones.

Considering the stakes for India are high, it is about time the government disentangled itself from the industry's turf wars. The government must ensure that the monitoring of migratory birds and of poultry in the organised and unorganised sections of the industry does not deteriorate into a sham. Right now a greater threat to public health and the poultry industry arises from government apathy and less from H5N1. ■



RUHANI KAUR / CSE

Even if the virus does mutate, the world is in a better position to fight it now than in 1918

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ENVIRONMENTAL SCIENCES

Sweets foiled by silver

A toxic conduit into the body

VIBHA VARSHNEY

BEWARE, the next time you consume sweets coated in silver foil: the decoration is a source of harmful metals. While the amount of the foil ingested through sweets is very small, it still is a health threat. An estimated 275,000 kilogrammes of silver are annually turned into edible silver foil each year by small-scale manufacturers in the country.

The Prevention of Food Adulteration Act of 1954 (PFA) prescribes that food-grade foil should be at least 99.9 per cent silver. But this leaves an unspecified margin of 0.1 per cent or 1,000 microgramme (μg) per gramme for contaminants. To find out what kind of fillers the manufacturers use, a team from the Food Toxicology Laboratory of the Industrial Toxicology Research Centre, Lucknow, collected 178 samples of silver foils from the local market. The results of this study will be published shortly in the journal, *Food Additives and Contaminants*.

The team found almost 10 per cent of the samples (17) were not silver at all but aluminium. Of the remaining 161 samples, less than half (46 per cent) adhered to the desired purity requirement of 99.9 per cent silver. Copper was present in 86.3 per cent of the silver foils; chromium, nickel and lead in over 54 per cent; cadmium in 28 per cent and manganese was present in 6.8 per cent of the samples (see table: *Average level of metal...*).

The presence of heavy metals in the foil is a health hazard. Exposure to nickel is known to lower body weight, damage the heart and the liver and also irritate the skin. Lead can disrupt the synthesis of haemoglobin, affect renal function, the gastrointestinal tract, joints,



DEBOYOTI KUNDU / CSE

AVERAGE LEVELS OF METAL PER GRAMME OF SILVER FOIL

487 microgrammes	Nickel
301 microgrammes	Lead
324 microgrammes	Copper
83 microgrammes	Chromium
97 microgrammes	Cadmium

Source: Industrial Toxicology Research Centre, Lucknow

the reproductive system and the nervous system. It has also been linked to neuropsychological problems in children.

"The average level of lead in foil samples is unacceptably high," says Thuppil Venkatesh, head of biochemistry and director of the National Lead Poisoning Centre at St John's Medical College in Bangalore. The maximum permissible limit

of lead in water set by the World Health Organization (WHO) is 50 μg per kilogramme, while the metal's average level in the samples was 6,000 times higher.

"The results justify the need to prescribe limits for metals that make up the 0.1 per cent in the silver foil, just like in other food commodities," says Mukul Das, one of the researchers who carried out the study. Silver of purity grade as

high as 99.999 per cent is achievable but the process is expensive. The scientists, however, feel even 99.5 per cent silver grade could serve the purpose provided the remaining 0.5 per cent is made up from silver alloyable, safe filler metals such as iron, tin, zinc and copper. But even for these metals that are not considered a threat to health, there was a need to set safe limits.

The researchers question the necessity of using the foil at all though they admit that doing away with it altogether would need a change in public attitude. Like PFA, the Joint Expert Committee on Food Additives of WHO and the Food and Agriculture Organization also included silver in the list of food additives, but did not specify its

composition. Even the European Council prescribes a minimum silver purity of 99.5 per cent, which leaves a margin of 5,000 ppm for contaminants.

The foil is made by putting a sheet of silver between sheets of bovine intestine tissue treated with chemicals and herbs to harden it. The silver sheet is made paper-thin by pounding on the tissue. The chemicals used to treat the tissue could be the source of the heavy metals in the foil.

The researchers say the fact that all the samples of the silver foil did not have high level of heavy metals suggests that there are some processes which are safer and could be followed. But foil making is a small-scale industry and manufacturers are unwilling to reveal their secrets. Metals like lead might get into the foil if old newspapers or printed waste paper is used to hold the foil instead of fresh paper. "We are sending this information to the regulatory bodies to see if these parameters could be laid down," says Das. ■

ENVIRONMENTAL SCIENCES

Low exposure, high risk

Finds study on common contaminants

PADMAPARNA GHOSH

THRESHOLD levels of exposure to environmental risks are crucial for regulatory agencies to determine safe limits for harmful contaminants. Though any level of exposure to carcinogens is harmful and regulatory agencies use linear dose-response models to estimate the risk to human health, they usually assume threshold levels exist for non-carcinogens. But recently, two scientists have found no apparent threshold for health risks even with non-carcinogens, and, in some cases, higher risks per unit of exposure dose at low levels (*Public Library of Science (Medicine)*, Vol 2, No 12, December, 2005).

Donald T Wigle from the Centre for Population Health Risk Assessment, University of Ottawa, Canada, and Bruce P Lanphear from the Cincinnati Children's Environmental Health Center, Ohio, the US, studied dose-response relationships over exposure ranges far below those generally used in animal studies for four of the most widespread and extensively studied environmental hazards — lead, tobacco smoke, radon and chlorine disinfection by-products in drinking water.

In a study of over 4,000 children, scores on four cognitive test subscales (mathematics, reading, block design, digit span) were found inversely associated with blood lead levels, even in analyses restricted to those with blood lead levels less than 10 microgramme per decilitre ($\mu\text{g}/\text{dl}$). The inverse relationship for mathematics and reading scores persisted in the subgroup with blood lead levels less than 5 $\mu\text{g}/\text{dl}$, and reading deficits per unit blood lead increment were greater among those with lower blood lead levels.

In the case of chlorine by-products in water, it was found that men exposed to trihalomethanes (THM) levels slightly above 1 $\mu\text{g}/\text{l}$ (regulatory standard is 100 $\mu\text{g}/\text{l}$) had a 24 per cent greater bladder cancer risk than less exposed men, representing an excess lifetime bladder cancer risk of about seven per 1,000.

The scientists say most threshold limits were calculated on the basis of animal studies alone. These had obvious drawbacks: animal studies include shorter exposure period compared to humans, testing is often limited to adult animals, use of genetically homogeneous animals (human populations are genetically diverse), the use of very high doses of test chemicals and small numbers of test animals. These factors become significant when extrapolating results across species to humans. For



Even less smoking is harmful, more than what you think

instance, neurotoxic effects of prenatal or early-life exposure to lead, polychlorinated biphenyls and methylmercury in humans occur at intake levels about three orders of magnitude lower than those predicted from rodent data. ■

HEALTH & MEDICINE

HapMap released

Makes for more effective cure of several diseases

SCIENTISTS and even practitioners of traditional medicine have long believed that understanding the genetic makeup of a person could help tailor a healthier diet. The same principle can now be extended to a database of small variations in a person's genetic makeup called HapMap, to devise more effective cures and treatments.

HapMap is a map of haplotypes. A haplotype is a set of closely linked markers on a single chromosome that tend to be inherited as a group. The International HapMap Consortium recently released the HapMap (*Nature*, Vol 437, No 7063, October 27, 2005). The database will be freely available on the Internet. A follow-up of the Human Genome Project, the HapMap Project was initiated in 2002.

The database has information on small bits of DNA called single nucleotide polymorphisms (SNPs), which number about 3 billion. The scientists studied

over 3 million SNPs in two phases. The HapMap suggests a small percentage of SNPs (260,000 to 470,000) can be used as a shortcut to understand the role of genetic material in diseases such as Alzheimer's, asthma, cancer, diabetes and heart disease.

"Such information can help doctors prescribe the right drug in the right dose for each patient, as well as recommend prevention strategies that take into account individuals' varying responses to environmental factors such as diet," writes Elizabeth G Phimister in the *New England Journal of Medicine*. Recently, Josephine Hoh and colleagues at Yale University used the HapMap to study macular degeneration, a leading cause of blindness in the US.

Researchers say HapMap is not meant to minimise the role of environmental factors in disease development. "In fact, studying genetic factors may greatly increase the likelihood of our understanding the environmental contribution to illness," says Thomas Hudson, leader of the HapMap group at McGill University, Canada. As the genes have modified over time, the HapMap also gives clues to how evolution has modified DNA and shaped variation in natural populations. ■

HapMap also gives clues to
how evolution has modified
DNA and shaped variation in
natural populations

LIFE SCIENCES

Colour insight

How bees solve complex colour puzzles

THE visual system of bees is more sophisticated than believed, claims a study conducted at the University College London (UCL) that showed the insects solved complicated colour puzzles.

The study sheds light on how brain resolves one of the most difficult challenges of vision: recognising different surfaces under different colours of light. Such conditions might prevail when bees look for flowers in the dappled light on the forest floor. The findings appear in the online version of the *Proceedings of the National Academy of Sciences*.

For the study, R Beau Lotto and Martina Wicklein from the UCL Institute of Ophthalmology trained bumblebees (*Bombus terrestris*) to find artificial flowers of a particular colour using a nectar reward. They then tested the bees' ability to find the same flowers in scenes that were simultaneously lit by four differently coloured lights — ultra-violet-yellow, blue, yellow and green.

For different surfaces under the same light, identifying a particular surface when light colour changes is easy: all the vision needs to do is adapt to the scene's average colour, a bit like adapting to the darkness in a cinema hall. Far more difficult is to recognise the surface or object under multiple lights simultaneously. Earlier, scientists thought bees used to adapt to the scene's average colour. But the UCL study suggests the tiny brains of the bees solve the puzzle — which the most sophisticated com-

puters still cannot resolve — by using the colour relationships between objects in a scene that they found most useful in their past lives. The same strategy is also used by humans, and so the findings may enable understanding of the general principles by which any visual system can construct useful behaviour from ambiguous sensory information.

A long-term aim of this research is to exploit this understanding to build seeing robots that, like the bee with a mere one million neurons, can learn to find a simple flower in a meadow. ■

ENVIRONMENTAL SCIENCES

Air pollution worse

Three times greater risk to health than believed

A UNIVERSITY of Southern California led study has found air pollution poses almost three times greater danger to health than previously thought. The study by a team of American and Canadian researchers was based on almost two decades of data on chronic health effects of particulate matter less than 2.5 microns or $PM_{2.5}$, on residents of Los Angeles metropolitan area.

Researchers also noted specificity in cause of death with $PM_{2.5}$ more strongly with ischemic heart disease (ailments caused by a decreased blood supply due to narrowing of the coronary arteries) than with cardiopulmonary or all-cause mortality. They measured the relative risk of mortality — measure of the contribution of a particular risk factor (of $PM_{2.5}$) — associated with a 10 microgramme per cubic metre increase of $PM_{2.5}$. The findings appeared in the November issue of the journal *Epidemiology* (Vol 16, No 6).

Earlier studies took 1 or 2 pollution measures from several cities and compared health effects amongst cities. But for this study, pollution exposures of $PM_{2.5}$ were interpolated from 23 state and local district monitoring stations within Los Angeles to more accurately

HEALTH & MEDICINE

SOAP SENSE

Antibacterial washes no better

US scientists have found antibacterial soaps and washes are not any better than plain soap and water in killing germs at homes.

An advisory panel on non-prescription drugs to the Food and Drug Administration, the US, in its report on October 20, 2005, said studies showed clear benefits from hand washing with plain soap, especially when people are taught when and how long to wash. Data on antibacterial soaps, on the contrary, are limited.

The scientists also asked the regulatory body to weigh the risk of creating drug-resistant bacteria through such special soaps and

reflect air pollution exposure where residents live and work. The study involved 22,905 participants (American Cancer Society subjects) over a period from 1982 to 2000.

The researchers found the health effects increased to nearly 17 per cent from about 6 per cent increase in mor-

The study involved as many
as 22,905 participants on
whom data from 1982 to
2000 was analysed

Smarter than believed



NATIONAL HISTORY MUSEUM



the benefits claimed by their makers.

In a similar study, a scientist at UK's University College London (UCL) said the performance of antibiotic and antiseptic soaps in hospitals should be evaluated. "Bacteria generally do not grow on top of one another. So when we wash our hands, we could actually be killing off harmless commensals (the bacteria that normally thrive in the human body) to the extent that we leave space for other pathogenic bacteria to settle," says Mark Spiegelman of the UCL Centre for Infectious Diseases and International Health, in a paper, published in the November issue of *Annals of the Royal College of Surgeons* (Vol 87, No 6). He suggested it is better to use a plain soap and subsequently dip the hands in a probiotic substance such as yogurt.

SHYAMMAL

PHYSICAL SCIENCES

Bacterial sensor

To measure humidity

SCIENTISTS in the US have designed a bio-electronic device exploiting a bacterium's ability to puff up and deflate in tandem with humidity in the air.

University of Nebraska-Lincoln scientist Ravi Saraf and his doctoral student, Vikas Berry, created a silicon chip covered with several extremely fine gold electrodes to which they applied a suspension of bacterium *Bacillus cereus*. Then they dipped the chip in a solution of positively charged gold nanoparticles, which are attracted by the negatively-charged bacterial surfaces.

"On the bacteria's surface, there are these filaments that grab the nanoparticles," said Saraf. "When the humidity increases, the bacteria swells because it absorbs moisture, and it contracts when the humidity goes down. When it swells or contracts, it increases or decreases the distance between the nanoparticles."



Bacterial bridge

UNIVERSITY OF NEBRASKA

The researchers applied a small voltage across the electrode pairs and measured the current generated. They found if the humidity was increased, say, from about 0 to 20 per cent, the current decreased by a factor of 40. The chip reacted so sensitively to changes in humidity because moisture caused the bacterial membrane to swell, which increased the distance between the individual gold particles attached to it, impeding the flow of electrons and, thus, the current.

What is interesting is that the sensitivity of the device increases when the humidity goes down, when other devices don't do well. "In the low-humidity range, our device is a factor of four to five times better than anything out there, in microelectronic devices," he said. The invention was published by the highly respected German journal *Angewandte Chemie International* (Vol 44, No 41, October 7, 2005). ■

BYTES



VIRAL CANCER: The fusion of human cells is a normal process that leads, for instance, to the formation of muscle and bone. Viral infections can also cause cell fusion, but such cells are generally believed to die without consequences for the host. According to a recent study, however, cell fusion triggered by viruses is a possible contributing factor in the development of human cancer.

The study by Yuri Lazebnik and his colleagues at Cold Spring Harbor Laboratory in the US raises concerns about the use of fusogenic viruses as vectors for human gene therapy or in other clinical applications.



STRONG VALUES: Keeping your values — what matters to you and why — in the forefront of your mind seems to cut

stress and may fortify you against physical illness, according to a study at the University of California in Los Angeles (UCLA), USA.

A further point worth pondering: it doesn't seem to matter whether those values are spiritual or secular. It just matters that you remind yourself that you hold them. The study was based on 80 UCLA undergraduates.



SPECIES' SPREAD: In a major development in human evolutionary studies, researchers from the

University of Cambridge argue that the dispersal of modern humans from Africa to South Asia may have occurred as recently as 70,000 years ago. Paleoanthropological projects must now be launched in South Asia if we hope to document the spread of our species and if we wish to explain how we became behaviourally modern, according to Michael Petraglia and his graduate student, Hannah James.

New route to nylon

Avoids use of corrosive chemicals

NYLON production generates large quantities of corrosive by-products. Now, a team of two British scientists has developed an environment friendly method to make caprolactam, which is the precursor of nylon.

An important textile and industrial fibre, nylon is a polymer (chain) of caprolactam and is used to make a variety of products including automotive parts, sporting goods and packaging materials. Its current global demand is estimated at 4 million tonnes.

Conventionally, caprolactam is synthesised through a complex process from an organic compound called cyclohexanone, which is converted into its corresponding oxime, followed by a molecular rearrangement. The method has one major drawback: it produces immense quantities of unwanted ammonium sulphate — as much as 2.3 kilogramme for every kg of caprolactam. Ammonium sulphate is used as a fertiliser in sulphur-deficient soils, but it has a small market. The nylon-manufacturing process also entails use of highly active reagents, such as sulphuric acid, that are highly corrosive.

The new process of producing caprolactam developed by John Meurig

Thomas from the department of materials science and Robert Raja from the department of chemistry of the University of Cambridge is far simpler and does not require use of corrosive chemicals. An offshoot of the team's 15-year-long research in solid-state chemistry, the method uses a cleverly designed catalyst with tiny pores to produce caprolactam from a reaction between ammonia and air at a temperature of 80 degree Celsius. The method is described in the September 27, 2005 issue of the *Proceedings of the National Academy of Sciences* (Vol 102, No 39).

The peculiarity of the catalyst — aluminophosphate — is that it can simultaneously hasten two types of chemical reactions, one independent of the other, occurring at two different types of sites. One set of sites is created by replacing some aluminium molecules with cobalt, manganese or iron molecules, and the other by replacing some phosphate molecules by either silicon or magnesium molecules. The for-

The new method uses a cleverly designed catalyst with tiny pores to produce the precursor of nylon

mer set of sites helps generate hydroxylamine from ammonia and air. Subsequently, hydroxylamine is mixed with cyclohexanone to form

the intermediate oxime. It's here the second set of sites come into play, aiding oxime molecules to rearrange to form caprolactam.

"We're proud of the fact that we've been able to tackle an environmentally harmful process using genuinely benign reagents and catalysts. This new method is simple, solvent-free and minimises production and disposal costs," says Thomas in a press release brought out by the university. ■



Anti-pollution software

To monitor sponge iron units

BIPLAB DAS Kolkata

A SOFTWARE has been designed to check the air pollution caused by plants manufacturing sponge iron. Known as the Environmental Compliance Monitoring and Control System (ECMCS), the software will monitor the functioning of electrostatic precipitator (ESP), the main air pollution control device in sponge iron units. In case of improper running of ESP, the software triggers an interlock system, bringing production to a halt.

Developed by the West Bengal Pollution Control Board in collaboration with Tata Consultancy Services,

ECMCS was pilot tested on September 5, 2005 in a one hundred tonnes per day capacity kiln at Durgapur. "This software will be made mandatory for every



Sponge iron units give off gas laden with suspended particulate matter, mainly coal dust

sponge iron-producing unit in West Bengal," says a WBPCB official.

In a sponge iron unit, iron ore is directly reduced in the presence of coal, dolomite and hot air in a rotary kiln (furnace) producing porous and spongy iron. It also produces gas laden with suspended particulate matters mainly containing coal dust. The gas is passed through ESP, which charges the particulate matter and traps it.

WBPCB officials say most units shut down ESPs at night. As a result, the suspended particulate matter escapes into the air, harming people, crops and waterbodies. "If ESP remains closed, the software will activate an interlock system, which in turn stop the raw material (iron ore, dolomite, and coal) feed to rotary kiln that churns out sponge iron," remarks the official. ■

No lifesaver this

Still no viable alternative for drugs price control

VIBHA VARSHNEY

An effort to regulate drug prices, through measures “other than price control”, has been wasted. A task force (TF) set up as per Supreme Court (SC) recommendations to find ways to reduce prices of life-saving drugs, could not come up with many viable solutions. The TF had representatives from the Planning Commission, Union ministry of health and family welfare (MOHFW) and ministry of chemicals and fertilisers (MOCF). It recently submitted its recommendations to MOCF’s department of chemicals and petrochemicals.

Which drugs to regulate?

A major suggestion is to use the national list of essential medicines as a basis for selecting the drugs whose prices need to be regulated, not controlled. Though the existing Drug Price Control Order (DPCO) of the MOHFW puts out a list of drugs under price control, policy changes have cut down their numbers in the last few years. As per the Drug Policy, 1994, the list had 76 drugs. In February, the government announced the Pharmaceutical Policy, which, if implemented, would have brought the number down to around 30. To stop its implementation, a consumer filed a public interest petition in the SC. At present prices of 71 drugs are controlled.

As this control reduces profits for drug manufacturers, companies shy away from manufacturing these medicines. For drug manufacturers to accept the list, the TF suggested changes in the way drug prices were fixed. It said the ceiling price should not be based on the cost price of the raw material. Instead, the average price of the top three brands of the country should be used. But this could lead to a big leap in prices of medicines. An analysis in the *Economic and Political Weekly* (October 8,

2005), demonstrates this hike in price with the example of a 400-milligramme tablet of the anti-worm medicine albendazole. It says that if the average price of the top three companies were taken, one tablet of albendazole would cost about Rs 10.50. This is more than 2,900 per cent margin over the cost of the raw material, which comes to just 36 paise per tablet.

Price control

The TF also suggests that, instead of controlling the price of raw materials, that of finished products should be regulated. DPCO currently fixes the price of raw materials and puts the financial burden on small manufacturers. If the report is followed, drug manufacturing cost would increase, hiking the price of the finished product.

In the case of a new drug, the TF recommends that manufacturers introducing new medicines should submit intended entry price along with their applications for marketing approval. This could be difficult as the drugs controller general gives the marketing approval, while the MOCF decides the prices. Also, the TF suggested the price of the medicine should be negotiated at the stage of

approval. But it failed to mention the authority responsible for this. It does not mention how these negotiations would comply with the Trade Related Intellectual Property Rights agreement regarding patented drugs.

The report also suggests that public sector undertakings (PSUs) involved in drugs manufacturing should be revived. These PSUs would provide medicines at cost price, effectively solving the problems of high price and non-availability. But this might not help in making patented drugs available.

Other recommendations include introduction of a new legislation called the Drug and Therapeutics (Regulation) Act and also establishing a National Authority on Drugs and Therapeutics as an independent regulatory agency. This would integrate the existing offices of the Drugs Controller General of India, Central Drugs Standard Control Organisation and the National Pharmaceutical Pricing Authority.

The MOCF will study the report before submitting the final draft to the Union cabinet for its approval. A drug policy expert feels, “The report at least identi-

fies the problems, even if solutions are not forthcoming. This is the first time a policy document has acknowledged the problem of overpriced medicines.” But others hope that some changes will be made in the report. M D Nair, a consultant to the industry, feels a better way to regulate drug prices is to ensure multiple suppliers of the drug. ■

The task force fails to find ways of making drugs affordable. Their suggestions could hike the price of medicines



The seeds of a plant called jatropha yield oil that, after processing, makes biodiesel. It can reduce India's burgeoning oil import bill. And there's lots of money to be made. But who will earn? What land will be used for this? DOWN TO EARTH feels the pulse

THE NEW MONEY

PHOTOGRAPHS: RUKSAN ROSE / CSE



Biodiesel became big in India in 2002-03. For a country reeling under the burden of a large oil import bill and spiralling oil prices — 70 per cent of petroleum used in India is imported, mostly from the volatile Persian Gulf region, at the cost of more than Rs 100,000 crore — it promises an indigenous, renewable source of energy. It also transforms the poorest people and the most marginalised lands into the source for this energy. Oil-yielding plants like jatropha (*Jatropha curcas* to scientists; *ratanjyot* in Hindi) and pongamia (*Pongamia pinnata*; *karanj* in Hindi) are hardy and can grow even in poor soils. This has captured the imagination of scientists, researchers, private companies, NGOs, state governments, farmers groups, and oil and transport companies.

The solution is seductively easy: villages grow a large number of oilseed trees; oil is extracted and put through a process called transesterification (to convert it to fatty acid esters, the chemical description of biodiesel, by incubation with alcohol and alkali); this makes it a suitable blend for petroleum-derived diesel. Additionally, biodiesel reduces emissions from diesel vehicles. The initial push for biodiesel came from the Planning Commission. There was a change of government at the Centre in May 2004, and the proposals are still under consideration. A mind-boggling array of Union ministries is eager to support and push biodiesel.

In the meanwhile, some state governments and private companies have already taken the cue and started expanding the biodiesel market. All shapes and sizes of private companies are jumping onto the bandwagon; not just to market oil but also to produce oilseed. While this is promising for the biodiesel sector, it raises a serious worry: instead of building on the production base of farmers, it is increasingly becoming a 'venture' for industries, whereby they want to lease large stretches of degraded forestland or so-called wasteland (more often than not, a misnomer for common lands in India) and grow their crops on their own, thereby bypassing farmers or, at best, providing them wage labour. The biggest challenge for the biodiesel programme is: whose land will be used to grow the crops? This will determine who earns from the biodiesel boom.

The concern becomes more serious if you consider the number of international companies eyeing India's competitive advantages in producing biodiesel. In Europe, biodiesel blending has been made mandatory. European companies are rushing in to source biodiesel from here. They tout the move as a way of tackling global warming through reduced emissions of biodiesel, as well as helping growth in a developing country. India could become to biodiesel what the Persian Gulf is to petroleum. If this happens, it is a great opportunity. But who will benefit? Will the additional income generated from a rural resource reach the rural producer or not? A first-hand assessment comes from Chhattisgarh, the state at the forefront of the biodiesel rush in India.

PLANT

Single-point fuel injection

Chhattisgarh is a lesson in biodiesel realities

With 40 per cent of its land under forest, and the reputation of being India's rice bowl, Chhattisgarh is a natural choice for promoting cultivation of plants of biodiesel value. But it takes more than good conditions to push such a major move: political will. Chief minister Raman Singh has backed the state's biodiesel programme, most prominently by running his car on biodiesel for the last few months. D N Tiwari, deputy chairperson of the state's planning board, was formerly a member of the Planning Commission of India, where he headed the committee on biofuels in 2002. The state is leading biodiesel production. The national mission is yet to kick off.

In January 2005, the Chhattisgarh Biofuel Development Authority (CBDA) was created to coordinate the state's ambitious plans to reclaim wastelands and create rural employment through jatropha cultivation. Its target: covering 300,000 hectares (ha) by 2007. This is 2.2 per cent of the state's total geographical area. By 2010, the state plans to cover 1,000,000 ha under jatropha. By then, says A K Shukla, executive director of CBDA, Chhattisgarh will need an estimated 1.5 million tonnes of jatropha seed and 500,000 tonnes of biodiesel on a yearly basis.

In the initial phase, the government is encouraging nurseries and distribution. Up to 500 plants are free of cost to farmers; thereafter, it costs 50 paise a sapling. NGOs, panchayats and cooperatives can buy saplings for Rs 1.50. Simultaneously, it is promoting private sector investment in contract farming, oil-expressors, and transesterification plants.

Tiwari claims 92 million saplings have already been planted this year. An average of 2,500 plants are estimated in each hectare, which means up to 40,000 ha is covered. In 2006, the plan is to distribute 200 million saplings. The FD provides the seeds, apparently selected and tested for yield and oil content. Seed collection for 2006 began in October through about 900 minor forest produce (MFP) cooperatives that will buy jatropha and karanja seeds from growers and collectors at the minimum support price (MSP) of Rs 4.50 a kg. The question is: who will plant and on whose land? Land is precious in Chhattisgarh (see box: *Land for oil...*), and a lot of conflict happens for control over it. What is also critical is the arrangement industries will have with farmers. As for value addition, the government has already set up a biodiesel processing plant. But most of value addition will be done by the industry.

Red carpet to industry

Funds and programmes of various ministries are being pooled for biodiesel. The government has issued a circular to departments involved, urging them to prioritise jatropha plantation.

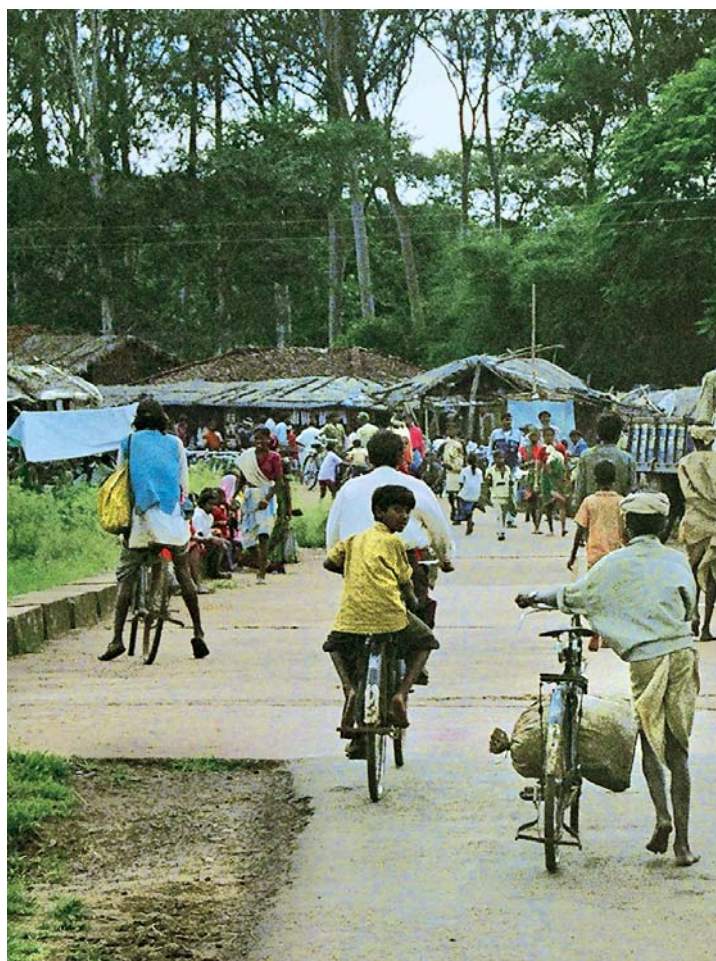


A jatropha nursery in Newari village, Kawardha district

About 60-70 per cent of the land — including broad strips along canals, roads and railways, owned by government departments and agencies — will be under block plantations. The remaining will be in small patches: farms, field bunds and on fences.

Apart from giving tax benefits to industry, it is preparing to amend or repeal several laws, like those pertaining to land use and agricultural produce marketing committees (APMC). Tiwari says the aim is to minimise government intervention. Market forces, he stresses, need to be propelled into action.

"Chhattisgarh is seeking Rs 15,000 crore investment in cultivation of jatropha and setting up of oil expellers and transesterification plants," says Brijmohan Agarwal, the state's revenue minister. The state government clearly doesn't want to restrict its share of the biodiesel pie to selling jatropha seed; it wants the value-added product to be created in Chhattisgarh. For this, it is luring private investors not just with land for growing jatropha but also with promises of cheap land, subsidised water and electricity



to set up plants. On September 3, 2005, the state government issued a notification entitled "Lease (Government Land for Jatropha/Karanj plantation and bio-diesel based processing unit) Rules, 2005". This allows a company to lease government 'wasteland' for the payment of Rs 100/ha. This increase gradually to Rs 1,000 per ha in the eighth year.

Last year, it got more than 70 proposals for allotment of 200,000 ha of government land for plantation. Shukla says the number is now up to 120. It includes big names like Emami, IFFCO and Kitply. Ten reputed biodiesel companies have offered to set up oil extraction units or buy the produce from farmers in Chhattisgarh. Companies like Indian Oil, Indian Railways and Hindustan Petroleum have each deposited Rs 10 lakh as security with the state government in anticipation of signing memoranda of understanding.

Natural selection

What's happening in Chhattisgarh today is seed collection for planting. There is a huge demand for the 'miracle seed' of Chhattisgarh. Jatropha is found in five regions: Bilaspur, Jagdalpur, Ambikapur, Raigarh and Raipur. "The variety from Pendra Road (in Bilaspur) has been identified as the elite variety," says Shukla. Sunil Puri, head biotechnology at the Indira Gandhi Krishi Vishwavidyalaya, says the oil content in the Pendra Road variety is highest at 48.2 per cent. In other parts of the country, the oil content of seeds is much lower, 29.7 per cent in Bhubaneswar and 34 per cent in Dehradun. This demand for the Pendra Road variety is naturally high. Pendra Road comes under the Marwahi

The demand from across the country for the 'miracle' seed of Pendra Road is huge

forest division of Bilaspur district. As livestock doesn't eat the plant, it has traditionally been used in fences here.

"The seeds are purchased from tribals in Marwahi forest division in Bilaspur," says Dhiren Sharma, additional principal chief conservator of forest. The demand for seed in the past year led to a mad rush; all kinds of seed found their way to the market. It is the poor families who sell the seeds in their attempt to make ends meet. Collectors sell seed to small-time traders in or around their villages. They in turn sell to the bigger traders in the vicinity or to the *seth* at the Pendra Road market. While seed collectors get about Rs 5 per kg, barely 50 km up the road in Pendra, traders fetch up to Rs 28 per kg. Sanjay Dubey runs a shop further down the road and trades in about one tonne of jatropha seed. "Last year people from Andhra Pradesh came looking for seeds and by the end of the season prices had gone up to Rs 15-16 a kg."

According to the divisional forest officer (DFO) at Pendra Road, the price has settled at Rs 8-10, but it is still early in the season to be sure. Traders say even the FD bought seeds last year at Rs 18/kg from traders. *Down To Earth* reporter found no one is willing to sell at the MSP of Rs 4.50 announced to protect the seed collector and keep the price close to Rs 5/kg mark — the amount it should cost to make the price of biodiesel competitive.

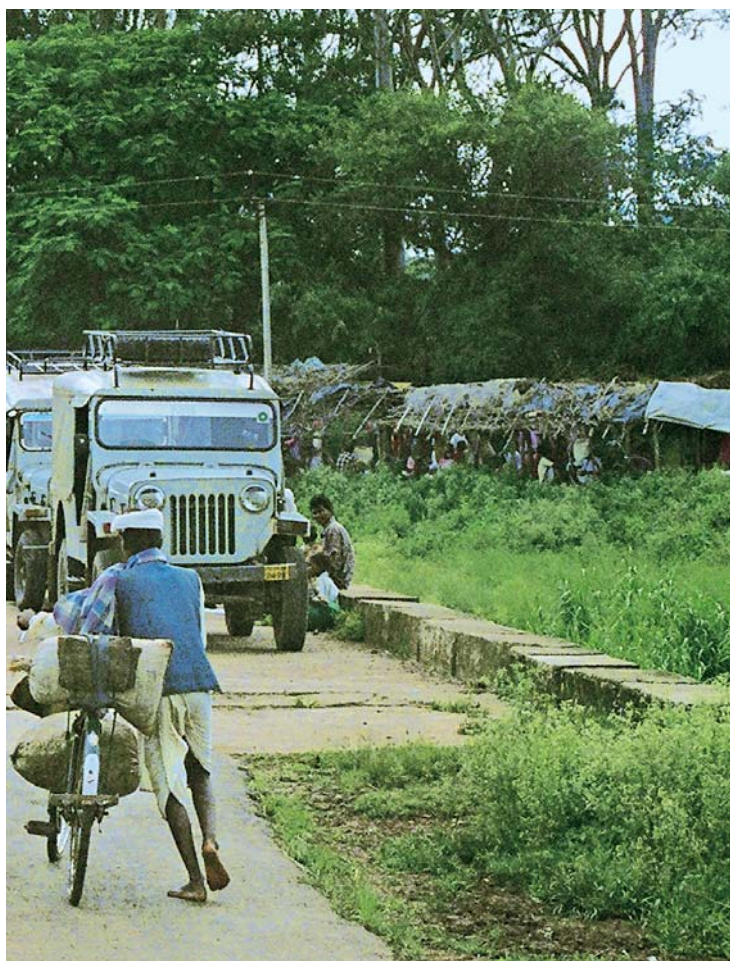
FD sourced about 12.5 tonnes of seed last year through some 34 MFP cooperative societies, who bought them from seed collectors in villagers. The societies started buying at Rs 8 and were offering Rs 16 by the end of the season. The targets were very high, and FD was rushed. The saplings have to be raised, land identified and they have to be planted before/during the monsoon season to take advantage of the rains. Anando Babu, senior forester at the MFP federation, says, "This year, we plan to use the existing system for collection of nationalised MFP like tendu and harra." These will be stored in godowns and sold to companies as raw material in the future.

Survival of the richest

Subhash Chandra Agrawal, a trader who deal in jatropha seed, says "We will sell to FD only if they improve their rates, otherwise we'll sell to someone else." Customers are many. Ashok Kumar Jain, one of the biggest traders in jatropha, says over 25 truckloads were bought from the Pendra Road market in 2004. Others mention 50 trucks. Each truck holds about 12 tonnes. FD bought 60 tonnes, which accounts for five trucks only. Where did the remaining go? The DFO says seeds from here are supplied all over the country and over 200 tonnes was sold on the open market last year.

It has emerged unequivocally that the winners in the jatropha seed trade are traders and private nursery owners. Some traders have even set up their own nurseries. People have started mentioning that the reason to choose *jatropha* and insisting on plantation instead of sourcing the wide variety of available seeds from different plants was precisely to create a market where a number of players make money, and not just a few.

Besides, the Pendra Road variety is known only for the higher oil content, not higher yields. Jatropha can be grown both from seeds and cuttings. In some places like Sadwani village on the Pendra Road-Bilaspur route, the village boys found



LAND FOR OIL. AND NOTHING ELSE

Jatropha is more important than anything else. Even common pastures and biodiversity

The Chhattisgarh government has identified 1.9 million ha of such 'wastelands' around the state. In Newari village of Kawardha district is a large government nursery that grew 1.5 million saplings of jatropha last year. Most were distributed to panchayats, farmers, NGOs and companies all over the state; about 25,000 remain. Although each farmer can get 500 plants free, Newari residents haven't bothered to take any; their fields are too far away, the transport cost too high. "We don't have any real information, except that in two or three years each plant will yield 3-4 kg of fruit, with the yield later increasing to 6-7 kg. A district official said if we plant jatropha, they would buy the seeds for Rs 4.50 a kg," says Phul Singh Yadav of the nearby Kolegaon village.

What they do know, though, is that the 19.5 ha village common is now out of reach for grazing, and women no longer have a relatively private spot for their daily toilet. The village sarpanch signed it off to the agriculture department for growing jatropha. "There was no gram sabha meeting. The sarpanch might have taken money in return for a favour. We were never informed the government was going to take over the land. Where will the cattle go now?" asks Yadav.

NO DIVERSITY FOR FORESTLAND

In the neighbouring district of Rajnandagaon, Jirakhan Yadav is also at a loss. His only source of income is grazing others' livestock on 44 ha of degraded forestland. He tends to 12 herds around the year in return for about

a ready market — Rs 25 for a 100 cuttings. They began lopping branches, virtually destroying a number of plants. The Marwahi DFO says cuttings grow fast but the yields are low. In fact, nobody is bothering about the yield right now; the government's declared the jatropha plant produces 3-5 kg of seed after the third year, going up to 7-8 kg in following years.

Sharma, being a forester, is cautious: "We tell people not to expect more than one kg per tree." The Marwahi DFO, who's seen the yield in the region, concurs. Villagers who have seen the plant for years quote the same figure. The agriculture university of Raipur has worked on *jatropha* for over a decade. Puri from the university dismisses claims that the plant will yield 3-4 kg: "In our plantations, we've noticed a lot of variability in yield." He says not much research went into the government effort to distribute seeds and set up plantations. "They are compromising on quality by not doing proper selection. What is being distributed is sourced from mixed, highly cross-pollinated plants. They're not genetically uniform. The chances of good production are about 10 per cent," Puri fears.

Puri also mentions the lack of research on pests and diseases: "Jatropha has grown more or less in the wild so far, not in monoculture plots, so the problem was limited. But in field plantations, more and more pests and diseases are developing, some of which we have not yet even identified" says Puri.

75 kg of rice for each animal. The forestland in Lal Bahadur Nagar is now out of bounds as 24 ha of jatropha plantation and 20 ha of teak plantation stand there. Graziers like Yadav have nowhere to go if people decide to stall feed livestock.

Then there is monoculture. As jatropha isn't a forest species, forestland can't have more than a 10 per cent mix of jatropha. "There will be no block plantations in forestland. A good mix of species will preserve biodiversity," says Dhiren Sharma, a senior forester. "When the chief minister visited the plantation, recalls Bharat Bhushan Shukla, a guard of the forest department, "villagers specifically requested a mix of plants instead of jatropha monoculture." The plants are now one year old. What's come up is a monoculture plantation of jatropha. On forestland.

A NEW PRESSURE ON LAND

In Surguja, social activist Gangaram Paikra emphasises the term wasteland is a misnomer — all land has a use for the villages. The pressure on land is such that *nistar* forests (for daily use), pastures and other common lands are encroached for farming. He cites Beldagi village, where forestland has been heavily encroached and a court stay means it can't be freed. Now, there is a new pressure: jatropha; and this one comes from the government. Wherever there is space, jatropha has been planted.

Government school grounds also haven't been spared. But, points out Paikra, the benefit is not coming to the small farmers.

Suresh Sahoo of Rupantar, an NGO in Raipur, is concerned about the impact on landless and marginal farmers. "Their food security," he says, "depends on roots and tubers foraged from wastelands after the rains." As village commons shrink and pressure on land increases further, the tragedy of the commons has attained a new meaning.



"Jatropha grows anywhere"

This is only partially true, and even the guard at the plantation on forestland in Kawardha knows it. The plants are healthy and about two metres tall where the soil is good here. But in some parts it is rocky, and rainwater and runoff from the nearby *nullah* accumulates in other places. The effect on plant growth is visible: the plants are less than half a metre tall. And this is a plantation that is well tended. Villagers were paid Rs 25 each per day to prepare the land, dig pits, transplant saplings and put in fertiliser and pesticides.

Productivity depends on many variables apart from genetic purity. "The land quality and management practises are critical in commercial production. While the plant grows anywhere, the yield required for commercial viability isn't assured on all types of land," Puri clarifies. "Intensive management is requisite in the first five to seven years. Even after that, for 35 years, management is needed," says Puri. On non-irrigated, degraded land productivity typically doesn't exceed 1-2 kg.

Obviously, the Chhattisgarh government has given the short shrift to homework and research and development (R&D). While it has shown commitment to the biodiesel sector, it hasn't shown the same intensity towards the rural people who are supposed to benefit from it. But the state can't be singled out here. The Union government is also lost in the woods on making biodiesel deliver economic growth all around.

Thick and fast

A high growth sector difficult to regulate

In July 2002, the Planning Commission formed a committee on development of biofuels, which recommended the creation of a biodiesel mission to coordinate the initiative and enterprise of individuals, communities, entrepreneurs, oil companies, business, industry, financial institutions as well as the government. It said that by 2006-2007, a pilot project should cover 400,000 hectares across the country. The committee also set the deadline of 5 per cent blending of biodiesel in diesel by 2007 — 2.62 million tonnes of biodiesel or roughly 2 million ha of mature plantation at current productivity estimates. This assumed a diesel demand of 52.33 million tonnes in 2006-07.

The pilot project was estimated to cost Rs 1,430 crore — half of the land was to be degraded forestland, where plantation was to be taken up by committees under joint forest management. The National Oilseeds and Vegetable Oils Development Board (NOVOD) was put in charge of plantation outside forestland. The Union ministry of rural development was to be the nodal body for the biodiesel programme. Oil extraction was to be under the Khadi and Village Industries Commission; the Union ministry of petroleum was to be responsible for creating 'micromissions' on transesterifi-

cation, blending and trade; the Council of Scientific and Industrial Research was to coordinate the micro-mission on R&D, quality and improvement of seeds, and improving production technology. But the grand plan is taking time to germinate. It is understood that the detailed project report is under consideration of the Planning Commission.

However, in October 2005, the Union ministry of petroleum and natural gas (MOPG) announced the biodiesel purchase policy: from January 1, 2006, public sector oil marketing companies — Indian Oil, Hindustan Petroleum and Bharat Petroleum — will purchase biodiesel from private operators at

Rs 25 per litre. The purchase price, which is a point of contention between the government and biodiesel producers, has reportedly come from estimates of the Planning Commission (see table: *Components of biodiesel pricing*). The government says its oil companies will set up 20 purchase centres in fifteen states. It promises to progressively move towards increased blending of biodiesel — from 5 per cent blend of biodiesel to 20 per cent blend.

The government says it wants to regulate the biodiesel industry to avoid adulteration and sub-standard produce. The manufacturers will have to be registered and get their samples tested at approved laboratories. This precludes manufacturers from selling to anybody other than oil companies. Industry says this will keep the price regulated and low. It wants to have the option to sell in the open or to other users like railways or bus companies. Or it is looking at the lucrative and growing export market for its golden tree.

The jatropha seed market is volatile. It makes a mockery of government's purchase policy

Components of biodiesel pricing

Estimates of the Planning Commission of India

	Cost (Rs)	Assumptions
Cost of Seed (Rs/Kg Oil)	16.40	Seed Rs 5/Kg, Oil yield 33%, 3.28 Kg seed produces 1 Kg oil
Cost of Collection & Oil Extraction	2.48	Losses 5%, 1.05 Kg becomes 1 Kg oil, Cost @ Rs 2.36 /Kg
Trans-esterification Cost	6.67	For 300 Tonnes/day plant
Cost of Bio-diesel per Kg	25.55	
Less Byproduct (oil cake)	-2.23	2.23 Kg cake @ Rs 1/Kg
Less Byproduct (Glycerol)	-3.80	0.095 Kg @ Rs 40/Kg
Net Cost of Biodiesel per Kg	19.52	As per Planning Commission
Net Cost of Bio-diesel per ltr	16.59	Specific Gravity of oil – 0.85
Sale price of Bio Diesel to oil companies per litre (excluding Excise/sales tax)	20.00	Profits @ 12% (Rs 2/litre), transport @ Rs 0.41/litre & Interest/misc. @ Rs 1/litre

Source: Planning Commission of India



Economics of the golden tree

Biodiesel plantation economics is fuzzy. The moot point concerns the productivity of the plant — jatropha or any other — and the cost of growing it. Jatropha's estimated yield varies from 0.4 tonnes per ha to 6 tonnes per ha. In other words, the farmer could get at the very minimum (at Rs 5,000 per tonne) as little as Rs 2,000 per ha or at the very maximum (at the same price) Rs 30,000 per ha each year on a recurring basis.

Currently, there is no real-time plantation to provide accurate yield estimates. The highly volatile market is speculating based on the seeds being collected from trees in forests and other village lands — seeds bought at Rs 5/kg from collectors in Pendra Road sell for Rs 45 in Lucknow. The price of seed will make the price of biodiesel out of reach. Take the example of Laxmi Biotech of Indore, which has set up a plant at the cost of Rs 25 lakh with a capacity of five tonnes per day. Its CEO Prabhu Shukla says jatropha seeds are not available and they have had to buy vegetable oil for Rs 28 a litre: "How will we sell at Rs 25? Till recently, Gujarat Oleochemicals was selling biodiesel made of imported palm oil at Rs 55 a litre."

The oil yield of the jatropha seed — 30-35 per cent —



means three kg of seeds can produce one litre of oil. If the farmer (or industry) is paid Rs 5-6 per kg it would mean that the raw material would cost Rs 15-18 per litre. Add another Rs 7-10 as the cost of oil extraction and transesterification, according to industry sources. In other words, at the lowest price of raw material purchase, the cost is Rs 22-28 per litre.

WHY ONLY JATROPHA?

Jatropha is not the only option for producing biodiesel. The Botanical Survey of India has identified over 300 species with non-edible, oil-rich seeds. As India has a chronic shortage of edible oils and imports it, non-edible oils are recommended for using in transport and other sectors.

Species with biodiesel potential include: pongamia, jatropha, neem, mahua, rubber and sal. The Planning Commission evaluated these and identified pongamia (*Pongamia pinnata* to scientists; karanj in Hindi) and jatropha as the most promising. Finally, jatropha was recommended for large-scale plantation because the biodiesel mission was designed to encourage large numbers of people to grow oil-bearing trees. It was important to recommend a plant that begins to yield quickly. Pongamia can take up to seven years before producing seeds in commercial quantities; jatropha begins doing so in the third year.

While the jatropha-pongamia debate has been more or less snuffed out by governments, some academics and researchers continue to question the wisdom of the choice. As pongamia grows widely all across the country, especially down south, the pongamia camp is stronger in Karnataka (where oil has traditionally been extracted from pongamia), Andhra Pradesh and Tamil Nadu.

In 2003, Samagra Vikas, an NGO in Bangalore, conducted a survey to determine the procurement of pongamia, neem and mahua seeds and the quantity of oil produced in the districts of Tumkur and Kolar in Karnataka and Gudiyattam in Tamil Nadu. The results were impressive (see table: *So obvious, so undermined*). Udipi Srinivasa of the Indian Institute of Science, Bangalore, estimates pongamia oil trade, controlled by the Mumbai commodities market, is to the tune of one million tonnes, mostly going into soap and lubricants.

The transit passes of the past three years with the Chhattisgarh MFP Federation show about 200 tonnes of jatropha seeds are available each year in the state. Pongamia

seeds, on the other hand, sell in local markets for about Rs 6 per kg, and transit passes show 1,000 tonnes of pongamia seed is traded. Pongamia grows by the roadside and many have taken up its plantation, and officials estimate about 3,000-4,000 tonnes of seed are available. This means 0.25-1 million tonnes of oil, from already available seed. The other advantage with pongamia is that it is found in regions that badly need economic development, like Bastar.

Pankaj Oudhia, agriculture scientist who's done most of his work on herbs, worries that large-scale plantation of jatropha, about which very little is known, could be disastrous. He fears toxicity of the seed and carcinogen in fumes of jatropha oil. Pongamia is as hardy and drought resistant as jatropha, and has a deeper root system that can draw from depths of 10 metres depths without competing with other crops. It needs very little

So obvious, so undermined

Existing market in three districts of Karnataka and TN

Non-edible oil seed	Total seed procured (tonnes)	Average price Rs/kg	Oil extraction (tonnes)	Average selling price Rs/litre	Cake obtained (tonnes)	Average selling price of cake
Pongamia	24,470	8.5	6,117	25.7	18,352	4.71
Neem	2,536	3.8	273	30	2,407	4.72
Mahua	39	10	8.5	26	30.5	3.75

Source: Samagra Vikas, Bangalore, 2003

care and studies show good tolerance of waterlogging, slight frost, salinity, and all types of soil — stony, sandy and clayey.

While jatropha begins to yield early and has the highest oil content in the seed (33 per cent, as compared to pongamia's 25 per cent), pongamia scores heavily on yield. Srinivasa has calculated pongamia yields from records of the Karnataka forest department. The yield increases steadily from the fourth year at the rate of 2 kg every year, until its 30th year! The economics are such that the planter's income can increase by Rs 5,500 per hectare per year. Very compelling numbers, those.



Industry says the price of Rs 25 per litre isn't viable. S Behuria, chairperson of the Indian Oil Company, says to be competitive, biodiesel price must match that of diesel. Industry says the price should be based on costs of producing the cleanest low sulphur diesel. Biodiesel is an environment-friendly and must be costed as such (see box: *Reduced emissions*).

Given the state of the Indian oil market, companies are already planning to either export the biodiesel or import cheaper raw material like palm oil. They are looking at the large European Union market, which having decided to blend 2 per cent biodiesel by 2005 and 20 per cent by 2020 has created a demand for 8 million tonnes of biodiesel. It is cheaper for Europe to buy biodiesel from developing countries like India, otherwise it will need land the size of Belgium to grow rapeseed, which it uses for its raw material.

Many believe that the fascination with jatropha is part of the biodiesel problem. While jatropha is in short supply, there are a number of other plants that are more widespread. H M Behl, scientist at the National Botanical Research Institute, Lucknow, has been investigating the properties of biodiesel from several sources. He feels the present purchase policy will benefit only large companies who have holding power and can take losses in the initial years. "Government should price the vegetable oil," he reckons, as it will encourage growers and not manufacturers (see box: *Why only jatropha?*).

But as the price of raw material is the most important component of this business, the industry's effort is to find cheap and reliable sources. Large business houses have their own business model. They prefer growing large-scale plantations for cost-effective and assured raw material.

The market model

The market is way ahead of any government plans on biodiesel. Many old and new players are making it their business. Biodiesel companies are literally the new BPO business. There are also large players in the nascent market, like the Indian giant Reliance or the UK-based firm D1 Oil, which is the largest player and has plans of 267,000 ha of plantations by early 2007 and 5 million ha in five years.

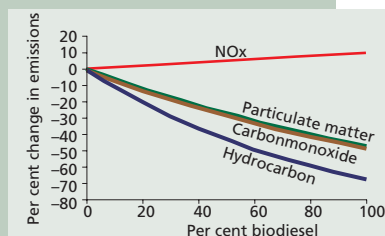
D1 has already signed agreements with a bevy of private companies, research labs, and even cash-strapped agriculture universities — in fact, the Union government is holding discussions with the company on how it can help India meet its

REDUCED EMISSIONS

Although biodiesel is very similar to petroleum diesel, and can be used as a substitute, it is much cleaner a fuel. The emission of unburnt hydrocarbons, carbon monoxide and particulate matter is substantially lower than that from petroleum diesel. It has almost no sulphur, no aromatics, and about 10 per cent built-in oxygen that helps it burn fully. The cetane number is higher than many fuels (in the range 48-60), which improves the combustion. Non-regulated emissions like polyaromatic hydrocarbons, which are carcinogenic, have also been found to be lower.

Emissions head south

With increasing blend of biodiesel



Source: Environmental Protection Agency, USA, 2002

A number of studies, in India and abroad, have shown vehicular emissions are reduced when biodiesel is blended with diesel. Biodiesel requires very little or no engine modifications up to 20 per cent blend and minor modification for higher percentage blends. Without modification, higher percentage blends can be a problem because biodiesel has high viscosity: it can result in gum formation in engine parts like the fuel injector and cylinder liner.

Now the best part: it can be produced in India.

Focus on jatropha has created a raw material shortage. Other, easily found plants are ignored

biodiesel targets. Rather than join the scramble for seeds picked from the wild, the company is investing Rs 8 crore in R&D to produce high quality seeds, says Sarju Singh, managing director of D1 Oils India, the UK company's Indian subsidiary. Last year, it set up a facility in Coimbatore for developing elite seeds, formulations of bio-fertiliser suited for jatropha, soil preparation and best agronomical practices.

The company started out making its small biodiesel refineries for transport companies in Europe. To make them viable, it needed a cheaper source of vegetable oil. The answer: jatropha, which will cost us \$200 per tonne less to cultivate in India than rapeseed oil in Europe, the main biodiesel feedstock in Europe at present, says Philip Wood, D1 Oils chief executive officer (global operations).

But this company, which specialised in smaller refinery technologies is not even willing to sell these in India. It wants to control the lucrative market.

It is looking for land for captive plantation. In the interim, it's working on tripartite agreements — loans from banks to farmers to grow oilseed and local contractor companies to source and control the markets. It has entered into a joint venture (JV) agreement with Chennai-based Mohan Breweries to create D1 Mohan. This will operate and control future projects in the region. In January 2005, D1 Mohan increased its 2005 planting target from 5,000 ha to 100,000 ha. By April 2005, D1



The Chhattisgarh government has set up this biodiesel processing plant in Raipur

Mohan had signed a memorandum of understanding with the State Bank of India to provide loans worth Rs 130 crore to farmers in Tamil Nadu for planting 40,000 ha of *Jatropha*. D1 will sell seed, fertiliser and probably consultancy. “In states like Andhra Pradesh (AP) and Chattishgarh we are planning a mix of joint ventures and contracts,” say company officials. Under the 50:50 joint venture with Mohan Breweries, the British firm is planning to set up an 8,000-tonne refinery near Chennai with an investment of US \$2 million. This will be a pilot plant that will be followed up with 100,000-tonne capacity plants in each district in Tamil Nadu once the availability of the oilseed increases.

Hyderabad-based plant biotechnology company Nandan Biomatrix has also tied up with D1 oils, as well as UK-based Synergy Foundation and also the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). Nandan enters into a ‘forward sales agreement’ to produce good quality *jatropha* seeds. The landowners lease out their land. The third party is the landless, who put in their labour. “This particularly benefits the landless who get sustainable employment,” says C S Jadhav, director marketing. This is how they plan to cover 50,000 ha through its 25 franchisees in various parts of the country over the next two years. The company will concentrate on R&D to produce clones from its 18 mother plants to supply to farmers and has tied up with ICICI-Lombard and Oriental Insurance to provide the farmers insurance at 1.3 per cent per year. D1 Oils has also been looking at partners in Rajasthan and, more recently, in the Northeast.

The Indian arm of D1 Oils is working with various state governments on wasteland policy as well. But, according to Singh, for the moment the focus is unproductive land belonging to farmers. A fact-finding team of D1 Oils is looking at the government wastelands on the offer. “So far we have found that a lot of it is encroached or too rocky to really take up plan-

tations,” says Singh. Most industries are desperately looking to the state governments (like the more than willing Chhattisgarh) to give them state-owned land at throwaway prices or to allocate large tracks of forestland for biodiesel plantations.

A different business model

Mani Shankar Aiyer, the present Union minister for petroleum and natural gas is also the minister for Panchayati Raj. On November 5, 2005, Aiyer — wearing his Panchayati Raj hat — announced a new model for the biodiesel programme involving panchayats. He called it the P-4 model: public-private-panchayat-partnership. This would involve the local government in identifying village wastelands and common lands for plantation, and set up systems for seed collection and local oil extraction. The minister also wanted the local self government bodies to set up transesterification plants through agreements with the private sector. A plethora of schemes are directed at panchayats; they could use these for creating plantations.

But the plans articulated by the minister could come to nought unless there is a supportive and facilitating framework. This is precisely what the states of AP and Uttaranchal are finding in their biodiesel rush.

In June 2004, the AP government decided to introduce large-scale *jatropha* plantations in the rain shadow districts (rainfall below 600 mm) of the state. The aim: to cover 1.5 million ha in four years. A department of rain shadow areas development (RSAD) was created and put in charge of the biodiesel programme. Within a year, district collectors, along with project directors of the district water management agency (DWMA) identified about 16,000 ha covering 15,000 farmers — half the land and farmers are in irrigated regions and the remaining in rainfed areas. Government estimates show in 2004-05, 37 million tonnes of seed were procured and 17.2 million *jatropha* seedlings were given free of cost to farmers. Land development

Governments have a choice: they can go the industry way, or prioritise rural enterprise

work like digging pits and bunding is being funded through the food for work and other development programmes.

The state is looking at the biodiesel programme as a rural development package. The government has announced a 90 per cent subsidy (up to Rs 50,000) to all farmers for installing drip irrigation systems, says Manohar Prasad, secretary RSAD. The state is targeting cultivable lands of private landowners instead of 'wastelands'. It's put in place plans to reduce risks to farmers: it wants agreements between farmers, the private sector and the state biodiesel board to ensure industry purchases the produce. The government has worked out a minimum income plan in case of low yields to protect the farmer. It has reduced the value added tax (VAT) on biodiesel to 4 per cent.

The state is also seeking out those interested in setting up transesterification units. Prasad says the response is "overwhelming". For example, Solarsa India Private Ltd, a unit of Renewable Energy and Sustainable Technologies, USA, proposes to set up a plant with an annual capacity of 300,000 tonnes at a cost of about Rs 300 crore. This involves *jatropha* plantation in about 4,050 ha of wasteland.

Uttaranchal, too

The Uttaranchal government has a slightly different approach. A K Lohia, general secretary of the new State Biofuels Board, says the state's vision is "employment generation through *jatropha* plantations to help alleviate poverty and ecological restoration". The Uttaranchal Biofuel Mission was launched in August 2004. He says the state has around 1.2 million ha of "almost blank land", and soil erosion is a big problem. The state goal is to plant on 0.2 million ha, and will use joint forest management committees — *van panchayats* — to do this. A pilot project was carried out in 2004 on 360 ha. This year's target of 9,000 ha in plantation has been achieved, the government claims. The lands targeted are degraded forests under FD and local government.

"Our target beneficiaries are the poorest. Each of the 429 *van panchayats* in seven districts will identify ten families to work on 20 ha of land," says Lohia. The government is encouraging buy-back agreements to guarantee that seeds will be bought and processed. The minimum price of wet seeds is Rs 3 per kg at the plantation. If transported to the processing site, the price goes up to Rs 5 per kg.

The state sees *van panchayats* as having ownership of the seeds. Families identified for plantation and collection have been issued photo-identities. All payments are to be made by cheques for transparency. The Forest Development Corporation will make the payments to the families and get the dues collected from private companies. It will also pay wage supplements and local transportation costs. The government will give each family a one-time aid of Rs 7,000 for nursery raising and Rs 20,000 for plantation costs. It will annually provide Rs 2,500 for maintenance. The projected income of Rs 25,000 per family will then be just from sale of seeds. The state government will put in Rs 30 crore, with Central agencies chipping in with additional funds.

Oil boom

How will India manage it?

The opportunities in biodiesel are manifold. A renewable, environment-friendly source of energy is something India desperately needs. There is no question about that. But that doesn't mean the questions aren't there. There is already a strong realisation that the economic reforms of the 1990s haven't helped improve the rural economy. The biodiesel programme is one tool with governments to make up for that.

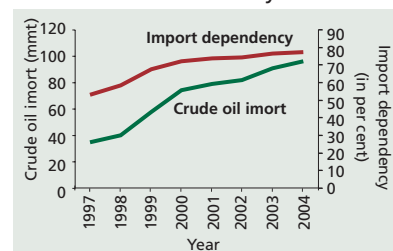
Which way will this programme go? Who will own the business of growing the oil of the future? Will we see concentration of wealth in the hands of a few or greater distribution of wealth? A lot will depend on who owns the land on which the biodiesel plants are grown and the arrangements made to buy the raw material. The primary producer has a disadvantage if the market is allowed to have a free reign. At the same time, the government can't stifle the private enterprise and all the attendant efficiencies it brings. Handling this will test the resolve of any government.

The impetus for the programme is coming from the escalating oil prices and the great burden it puts on a developing country like India (see graph: *Oil import burden*). What's also driving the sector is the EU mandating compulsory blending of bio-fuels. It is far cheaper for companies to grow the trees in developing countries. For India, this advantage is a result of the same rural population its policy-makers so love to ignore and its so-called marginal lands. To harness this sector and make the best use of it — both for greater energy security

domestically and expanding the export market — governments will have to ensure the advantage remains with farmers. The policies need to be supportive of them. A more decentralised approach will, for example, give incentive to and nurture the decentralised business of oil extraction in Indian villages. The policy should not reduce villages to suppliers of *jatropha* seeds. Instead, they should be selling vegetable oil, and be able to set up their own esterification plants. For the same, the biodiesel programme shouldn't be restricted to *jatropha*. Other plants of biodiesel significance must be included. For this, the most essential is investment in R&D; the sort made for agriculture before the Green Revolution. The same farmer who made India self-reliant in foodgrain can give India a more secure, renewable, green energy source. ■

Oil import burden

It has increased steadily



Source: MoP&G, 2005



Road maze

KIRTIMAN AWASTHI *Corbett Tiger Reserve*

For Khyali Datt Dourbi of village Laldhang near Ramnagar in Nainital district, Kotdwar seems to have become twice as far as it used to be. The journey was 90 kilometres (km) long till 2001 when he could take the Kandi road through the Corbett Tiger Reserve (CTR); now it has become almost 160 km because CTR authorities have closed the road forcing commuters to take a circuitous route through Uttar Pradesh (UP) between the two Uttaranchal (UA) towns (see map).

The Kandi road linking Kotdwar and Ramnagar has been in existence for almost 200 years. But a part of the road — the 18 km Jhirna-Kalagarh stretch — that falls in CTR has been a fair weather road (or *kuchcha* road, which had to be closed during monsoon). In 1996, prior to the formation of UA, UP forest department said that "...this fair weather road (partially going through CTR) if converted to all weather road...will help in protection and management of the CTR." In 1999, the Forest Advisory Committee of the Union ministry of environment and forests (MOEF) also cleared the road.

But when the UA government proposed the 18 km stretch be converted into an all weather road, two non-governmental organisations — Wild Life Protection Society (WPSI) and the Corbett Foundation — opposed the move. They put in an intervention application in 2001 in an ongoing case on conservation practices in tiger reserves and their management, filed by builder Navin M Raheja in the Supreme Court. The court ordered a stay on the construction of the road through CTR if it involved felling of trees. However, it also added that "...in case the road can be constructed without passing through CTR or affecting it as such, the restraint placed by us shall not come in the way of state of UA on the construction work of the road."

Concerned over the ecological impact of the road, CTR authorities subsequently closed it. Simultaneously,

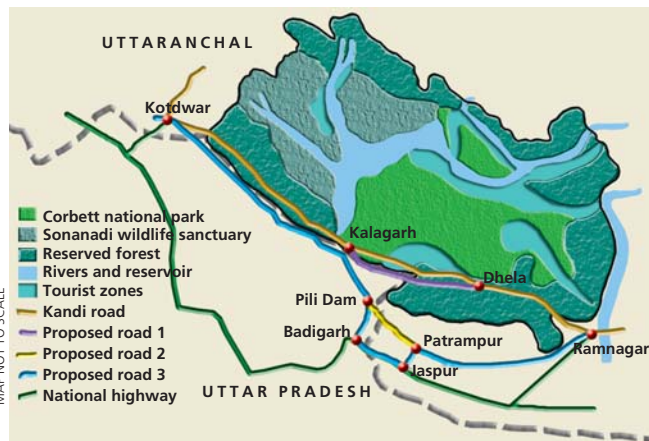
WPSI suggested an alternative: since CTR lies along UA's southern border, the controversial stretch of road could be shifted south, through UP. In a meeting on February 21, 2003, the Standing Committee of the Indian Board for Wildlife (IBW, now called the National Board for Wildlife) proposed the road be constructed through Kalagarh-Pheeknala-Dhela-Ramnagar (see map: Proposed road 1). But the Kalagarh-Pheeknala stretch would pass through the reserve forest of UP, which was unacceptable to UP.

A survey conducted jointly by MOEF, UA and UP governments, WPSI and Corbett Foundation followed. It proposed the road till Kalagarh be made on the existing fire line (a clearance made to contain forest fires) as suggested by IBW and then diverted to Pili Dam-

Patrampur-Dhela Barrage-Maldhan-Hathi Dangar-Ramnagar (see map: Proposed road 2). The map included in the survey showed most of the road — from Bhogpur, near Kalagarh, to Pili Dam — in UP, where a hard top road already exists. MOEF also suggested that "...a width of 1.5 km along the portion of the road passing through the buffer zone of the park will be notified as Eco Sensitive zone..." and no new construction of hotels, *dhabas* (roadside eateries) or repair shops should be allowed to come up in that area, except wildlife conservation related works.

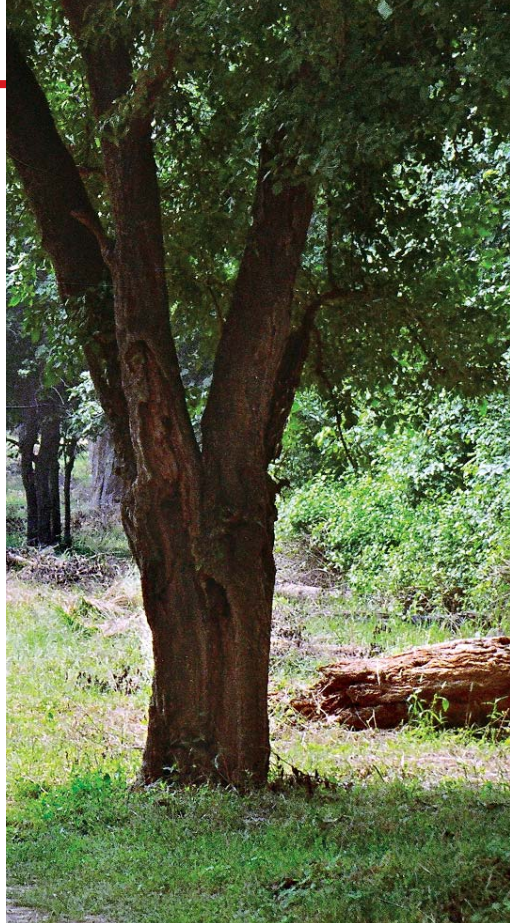
The UP government, however, felt that the Pili Dam-Patrampur stretch of the proposed road would "...divide the reserve forest of the state of UP, which is also used as buffer zone to the park." UP rejected the proposal.

Three options have come up to avoid making a road through CTR. The last option is acceptable to the two states and the MoEF, but not to the local people



PHOTOGRAPHS: KIRTIMAN AWASTHI / CSE

The controversy around the Kandi road through the Corbett Tiger Reserve



Meanwhile, the UP government proposed another alignment by diverting the road from Pili Dam through Vadigarh-Angadpur-Jaspur (see map: Proposed road 3). This modification has been accepted by both MOEF and UA, which now awaits the Supreme Court ruling. But this time it is the local people from Ramnagar area who are opposing the road. "This alignment has been proposed exclusively to benefit few influential resort owners including Raheja," alleges P C Joshi, president of the Kotdwar-Ramnagar Motor Marg Sangharsh Samiti (KRMSS). He further charges that it was at the behest of the resort owners that, first, the CTR stretch of the road was put into abeyance and then, the new alignment was proposed which passes through their lands. "When there is already a national highway running parallel to it just six km away, what is the need of this highway?" he asks.

The alignment of the road also benefits a tourism project — the Corbett

Country Tourism Destination — that is coming up near Hempur in Udham Singh Nagar district, claims Prabhat Dhyani, a resident of Ramnagar and a KRMSS activist (see box: *Destination tourism*). Environmentalists, wildlife conservationists and political parties are also questioning why the project was cleared without Cabinet approval and without studying its environmental implications.

Transporters have no problem with the new alignment provided the problem of double taxation is sorted out. But they admit that it would make the jour-

understand the problem faced by travellers, but we also need to maintain the integrity of CTR," says Gyan Sareen, a wildlife conservationist at Corbett Foundation. "We are not against the road; if government can build an elevated expressway so that it does not affect wildlife, it is acceptable," he adds.

The alignment suggested by IBW is another option, provided both the UP and UA governments declare eco-sensitive zones on either side of the proposed road and do not restrict wild animal movement, if any, in that area. If forfeiting its green crown was a great loss to

Destination tourism

Uttaranchal government is expediting an eco-park project

The Uttaranchal Tourism Development Board and the Ramnagar Eco Park Pvt Ltd, a consortium of three companies — Chescor Capital (UK), Magus Group and Fairwood Consultants — signed a memorandum of understanding on August 24, 2004 to develop a Rs 512 crore Corbett Country Tourism Destination at Hempur in the Udham Singh Nagar district. Spread over 325 hectare, the mega project would include an aviary, theme halls, a zoo, a promenade and a lake, conference facilities, therapeutic centre-cum-golf course, serviced cottages, apartments, motels, youth hostels and an agri-business zone, as it is expected to attract and cater to all sections of tourists.

The land, which the Uttaranchal (UA) government leased out for 10 years, belongs to NEPA Ltd and is used for eucalyptus plantations. About 200 ha still have eucalyptus plantation; the rest has been cleared and sold. Asked how the government could lease out land that is still with NEPA, a UA government official said on the condition of anonymity that negotiations are underway for its transfer to the government. According to the UA master plan prepared by Fairwood Consultants, the eco-park would act as a tourism hub in Kumaon and eastern Garhwal and provide easy access to other areas. The project is estimated to employ more than 2,000 people in various categories.

It is projected to earn about US \$1.77 million annually in foreign currency. In addition, tax benefits from the lead investor are estimated to be Rs 24.5 crore (as direct taxes) during the first 10 years; Rs 38.2 crore as lease premium and Rs 5 crore as annual lease charges over 10 years.



ney longer and put unnecessary burden on travellers. Others, however, are in favour of making Kandi road an all weather road. "It is not necessary that status of the road should be of a national highway, even the thorough fare road is acceptable if it allows our vehicles to ply," says Joshi. Local people claim that if they have to cross UP, they would rather use NH 74 which is running parallel to it (at a distance of 6 km).

The Kandi road could be used if it does not hamper the movement of wild animals, which is possible if ecological corridors are constructed. "We also

UP, UA got in its share relatively high percentage of forest cover and rich biodiversity — most of it protected. Although the natural resources and biodiversity have to be preserved, it is imperative for the fledgling state of UA to enhance its basic infrastructure like roads, not only to set the pace for economic development but also to support the livelihood and other day-to-day needs of the local communities. Conservation of wildlife and infrastructure development have to go hand-in-hand, not one at the cost of the other. One hopes the two states realise this. ■



Holy manure

Temple offerings in Mumbai make for good compost

NIDHI JAMWAL *Mumbai*

Recently, certain Mumbai temples have become sites of an initiative that's not entirely religious. *Nirmalaya*, floral offerings made by devotees, is composted at these temples and the manure is sold for Rs 20 per kilogramme. *Nirmalaya* manure has become quite a hit among devotees.

The project is the brainchild of Prathibha Bawlekar, vice chairperson of Mumbai Grahak Panchayat (MGP). "Mumbai's temples generate about 15 tonnes of *nirmalaya* waste every day. Earlier, much of this made its way to the sea despite a ban on such disposal. Many local train passengers would carry the flowers in polybags and throw them out in the Mithi river," she says. About seven years ago, Bawlekar began persuading temple authorities to compost their waste. She was rebuffed time and again. The Municipal Corporation of Greater Mumbai (MCGM) also offered no support.

After much persuasion, in 2002, authorities of the Parleshwar temple decided to allow Bawlekar to compost *nirmalaya*. "They did set two conditions though: I will not ask for any financial help or human power," she reminisces. MGP decided to fund the project. A contingent of waste-pickers was hired, the composting area was covered with a shed and the project took off.

"We follow the simple aerobic composting method: heaps of waste are accumulated and powder is added to culture it. A gram of powder is mixed with 1 kg *nirmalaya*, every other day. This goes on for about 20 days. Water is sprinkled regularly. It's important to churn the waste regularly, to prevent leachate formation and avoid stink. The compost is ready within 35 days," explains Bawlekar.

Siddhi Vinayak joins in

In June 2004, Bawlekar approached authorities of the Siddhi Vinayak Temple. Mumbai's most famous temple generates an average 120 kg of *nir-*

malaya every day — peaking at 200 kg on Tuesdays. The temple authorities were not against composting *per se* but did not want the activity within the temple premises. They relented in early 2005. Composting began in April, 2005.

Meanwhile, Bawlekar worked with the Mumbai-based Excel Industries Ltd (EIL) to develop a machine that reduces the total volume of waste and reduce the composting time.

After due testing they gifted one such machine to the Parleshwar Temple

Floral offerings to Mumbai temples used to end up in the Mithi river. Now it is composted



waste is fed into the machine along with the powder that's used to culture the *nirmalaya*. By running the machine for a mere 15 minutes the waste gets reduced by about 60 per cent. The waste is then heaped and composted.

"The entire procedure takes 15 days. A complete 20 days less than what would have taken otherwise," explains Sandeep who has worked on the project since it was introduced in the Parleshwar Temple.

After the deluge

The July 26, 2005 deluge washed off almost 300 kg of compost. At present 1,200 kg of compost is stocked with the Siddhi Vinayak temple but it can't be dried due to the persistent rains.

Bawlekar also has other problems. "I cannot hire more than three people because we lack the money. We can afford to pay our workers only Rs 2,000 per month. Most of them don't stay on. The only way to retain them is to pay them high salaries. The compost we sell is on actual cost basis so there aren't any profits. I hope temple trusts share the financial burden because most of them are extremely rich," says Bawlekar.

Moreover, most temples do not have a space to dry compost and the monsoon washes away everything. The



while the Siddhi Vinayak Temple Trust purchased another one for Rs 4 lakh to give the programme added impetus.

"The floral

space constraints and inadequate staff have meant that Siddhi Vinayak's composting unit cannot make use of the 200 kg *nirmalaya* generated on Tuesdays. The offerings on that day consist of sweets mixed with flowers. Bawlekar wants to hire a waste-picker to segregate these offerings, but she has no finances. Bawlekar has offered to take over all Siddhi Vinayak's waste management system, if the municipality provides MGP with land and finances. But the civic authorities haven't responded as yet.

Minor hiccups aside, there is no stopping MGP. The Tirupati temple in Andhra Pradesh has approached MGP to compost its floral waste. So has the Shirdi temple in Pune, Maharashtra. Another Pune temple wants MGP to manage its coconut shell waste. ■

बरसों से फाइलों में छिपी नहरें अब पहुँचेंगी खेतों तक

हमने एक बार फिर साबित कर दिखाया है कि यदि सरकार कुछ कर दिखाना चाहे तो कुछ भी उसके आड़े नहीं आ सकता। पिछले कई दशकों से फाइलों में दबी साढ़े छह तौ से ज्यादा योजनाओं को आपकी सरकार ने इस बरस शुरू करने, सुधारने और छह बरस के भीतर पूरा करने का जिल्मा उठाया है।

इन योजनाओं से तीस जिलों यानी प्रदेश के आधे से ज्यादा हिस्से में फैले ढाई लाख हेक्टेयर इलाके में खेतों को भरपूर सिंचाई मिलेगी। इन जिलों में विश्व बैंक की मदद से करीब-करीब दो हजार करोड़ की लागत से इन सिंचाई योजनाओं के साथ वैज्ञानिक ढंग की खेती, पशुपालन, मछली पालन और नयी फसलों के लिए भी नये कार्यक्रम चलाये जायेंगे।

इसके अलावा, इसी साल दूसरी कुछ सिंचाई योजनाओं को तेजी से पूरा कर डेढ़ लाख हेक्टेयर खेतों को सिंचाई मिलेगी। अब तक अधूरी पड़ी सभी सिंचाई योजनाओं को जून 2007 तक पूरा कर लिया जायेगा।



खुशाहाल कल के लिये ठोस कदम
मध्यप्रदेश सरकार

Phenotype factors

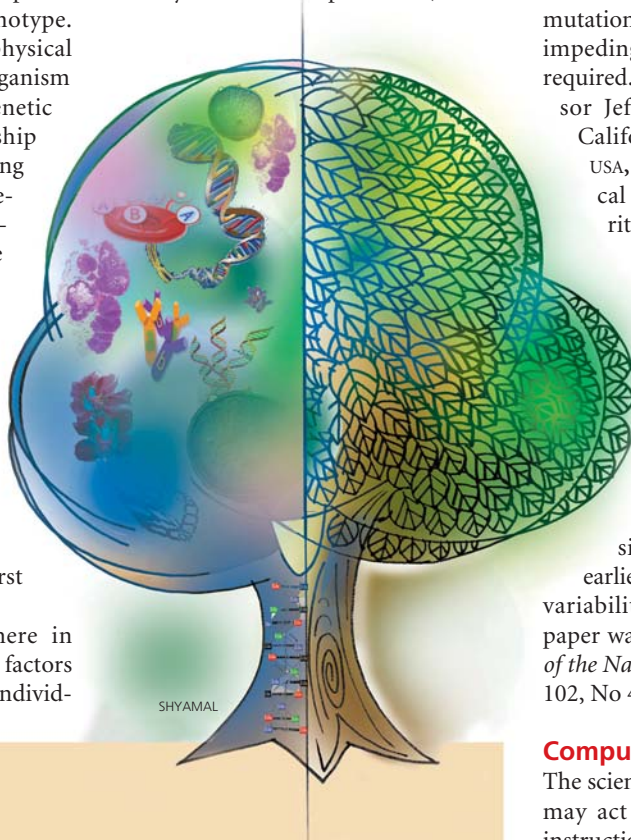
Nature, nurture and noise

KIRTIMAN AWASTHI

Every organism has two aspects: phenotype and genotype. Phenotype refers to the physical and behavioural traits of the organism and genotype to its internal, genetic composition. The relationship between the two has been for long the subject of fierce — and sometimes intensely acrimonious — debate, popularly known as the nature-nurture debate. Those who favour nature stress the primacy of genetic material in shaping the phenotype, while proponents of nurture favour the primacy of environmental factors of both the physical (quality of air, food, water) and cultural varieties. The former builds on the theories of heredity and evolution first propounded by Charles Darwin.

The truth resides somewhere in between because environmental factors are also known to influence an individ-

ual's phenotype. Take the example of the body's circadian rhythm — the 24-hour cycles of various processes (such as



Genetic noise

Role in evolution

Environmental factors can lead to genetic mutation by generating new gene alleles (either of a pair of genes). The new allele may improve its suitability (of propagation in subsequent generations) within the organism and increases its frequency, or decrease its suitability and finally disappear. Such interactions of genes with environment are another component of the nature-nurture debate.

But many mutations do not show immediate effects and such gene alleles are termed “genetic noise”. This genetic noise may produce extreme phenotypes known as outliers; in case of humans there are almost 17 outliers that are responsible for evolution of brain size and behaviour. If environmental changes improve an outlier's suitability, the entire population rapidly adopts the corresponding gene alleles. Thus, genetic noise makes the genome more suitable and stable.

“The mental picture many biologists have of a healthy cell at the genetic level is of a smoothly running Swiss watch,” says Jeff Hasty of University of California at San Diego. But now research is proving otherwise, he adds, referring to a study conducted under his guidance. Cell biologists have described genetic noise while recording large phenotypic differences between supposedly identical cells in a single growth medium. Even a slight change or genetic mutation may lead to variability at the level of the whole organism. “The phenotype of an organism is largely determined at the genetic level, so it is important to zoom in on the noisy details of gene expression to explain the variability that we couldn't otherwise account for,” adds Hasty.

hormone secretion, urine production) essential to life. This rhythm was believed to be dependent solely on internal factors, which in turn are determined by specific biochemical reactions occurring at the cellular level.

But according to a new study, environmental factors may also influence cellular reactions either through genetic mutations (see box: *Genetic noise*) or by impeding the production of chemicals required. Led by bioengineering professor Jeff Hasty at the University of California at San Diego, La Jolla, USA, the study was based on a classical model called Gillespie algorithm. The model simulates biochemical reactions in the cell, which are controlled by enzymes. The scientists modified this model to evaluate the combined effect of genetic mutations and delays in biochemical reactions on the phenotype (normal growth and behaviour). “This analysis of gene regulation extends earlier explanations of the observed variability of cells,” says Hasty. The paper was published in the *Proceedings of the National Academy of Sciences* (Vol 102, No 4, October 11, 2005).

Computer virus

The scientists say environmental factors may act as a “virus” to alter genetic instructions in much the same way that a virus acts in a computer — altering the instructions wired into programmed software. Given that the coupling of the 24-hour circadian rhythm and the external environment can be crucial to the survival of an organism, the results may lead to new insights into the importance of the synchronisation of genetic mutations within the day-night cycle. “Our analysis provides a framework for addressing the role of noise and time delay in the generation of biological rhythms that are extremely important in many contexts,” says Hasty.

The research supports the popular view that genetic constitution specifies the potential development of an organism's phenotypic expressions and environmental factors determine the manner in and extent to which this potential is reached. ■

Return our forests

S C TRIPURA, a Congress party member of the Tripura legislative assembly, talks to NITIN SETHI about the consequences of reserving forests in Tripura

The meaning of reserved forests in Tripura has changed with time...

Yes, we have always had reserved forests but not the sort stipulated by the current laws. The reserve forests of the princely state of Tuiperra (it acceded to India in 1949) did not exclude people; on the contrary, certain tracts were set aside for use by tribals.

Tribal reserves?

The king of Tuiperra had declared certain area of the hilly forests as reserves for exclusive use by five tribes of the region. In 1931, memo 49 of the kingdom reserved 2,850 square kilometres (sq km) for cultivation by tribals. Then again in 1943, another 2,200 sq km was set aside as a tribal reserve. The tracts were used for *jhum* cultivation.

What happened once Tuiperra merged with India?

Things became bizarre. The Indian Forest Act (IFA) 1927 became the overarching legislation that governed forests. The Indian government reneged on its stand during the merger negotiations. It had then stated quite unequivocally that unless the Indian Parliament amends the legislation of the princely state, IFA would not apply to Tripura.

But then the reserves were created under IFA?

Yes. In 1960, the Union government created exclusionist reserved forests without repealing the princely state's act. A petition was filed in the Supreme Court against this declaration. The apex court rejected the new imposition. In reaction, the forest act of the princely state was repealed by an ordinance — such an anti-people measure could have never passed through the Parliament.

What were the consequences of this move?

We were robbed of our main source of

sustenance, the forests. 60 per cent of our forests are reserved. My people roam the few unreserved tracts to practice *jhum*. Reserving forests under the IFA has made our existence completely illegal.

The impact on tribal society?

When our youth find they have no right over land in either the hills — because they have been made into reserved forests — or plains — because of the huge influx of migrants — they take up guns. Militancy is the last option, but quite pathetically, it's the only option for most. Today, we are asked to produce documents in support of our land rights. They created the paper work regime and then alienated us from our lands.

Is this alienation a historical process or a much recent phenomenon?

I am not talking history, please. The state divests tribals of their lands by legislation as well as by direct action. It created the Dumbor power project, which displaced more than 10,000 families. The project inundated the only large plain cultivable area available to the tribals: more than 97,000 contiguous hectares (ha). And what did the displaced tribal families get? None of them got any compensation when the dam came up, because the state had declared their land as *khars* (revenue) land. A huge hue and cry by the affected people did make that the state loosen its purse strings. Around Rs 84 lakh — in all — was given as compensation and around 670 ha was doled out for resettlement. But all that couldn't give the 10,000 families back their normal lives. Why can't we decommission the dam and

resettle people back there. After all, the Dumbor power project, that was meant to generate 18 megawatts (MW) of electricity, annually, produces merely 5 MW. Every year, the state spends Rs 4-5 crore on its maintenance.

Let's take another case. In 1974, the state tried to create northeast India's biggest cattle breeding farm over 1,200 ha in Tripura. Hundreds were shunted out of their land. But what happened then? Not one cow survives there. Security agencies and the Union government-owned North Eastern Electric Power Corporation have taken over the land.

There are numerous instances of the state robbing my people of their lands. It is not history; it's a present continuous for us.

What options have been given to the displaced and *jhum* cultivators?

Horticulture-based rehabilitation has been tried out. But no thought was given to create links with markets. Today, you can find pineapples strewn all over the roads in the state. There are no buyers. Those who live close to the highway 44 (the main arterial road across Tripura, that teems with security forces) find their best option is to sell one or two pieces of vegetable each day to the slow moving traffic. Can anything be more pathetic? Cordoned off from their own lands, stuck up in hills, coming down in morning to sell vegetables or firewood for a desperate rupee, and then going back to the village before sunset or they might be another casualty of the extremism this situation causes.

The way out?

Return our forests. ■



NITIN SETHI / CSE

Science crucified

A recent meet combats the anti-science wave in Europe

DINESH C SHARMA

In the second week of June 2005, walls all over Italy were plastered with: "Life cannot be put to test. Don't vote". The exhortations came from the Catholic clergy, which asked Italians to shun a referendum to repeal their country's law 40: a law banning embryonic stem cell research and restricting access to assisted reproductive technologies. The church carried the day. Only 26 per cent of the eligible citizens took part, roughly half the number required for it to be legally valid — though around 80 per cent of those who voted wanted the law repealed.

The acrimony over repealing Europe's most restrictive fertility law is symptomatic of science's embattled state. Evolution-related disputes checker the map of the Western world.

Religious leaders and the devout cry hoarse over embryonic stem cell research and human cloning. Womb hiring and assisted reproductive technologies are seen as signs of a looming dystopia. Scientists constantly ward off allegations of playing god, often — as in the case of the referendum over Italy's law 40 — unsuccessfully.

Future of science

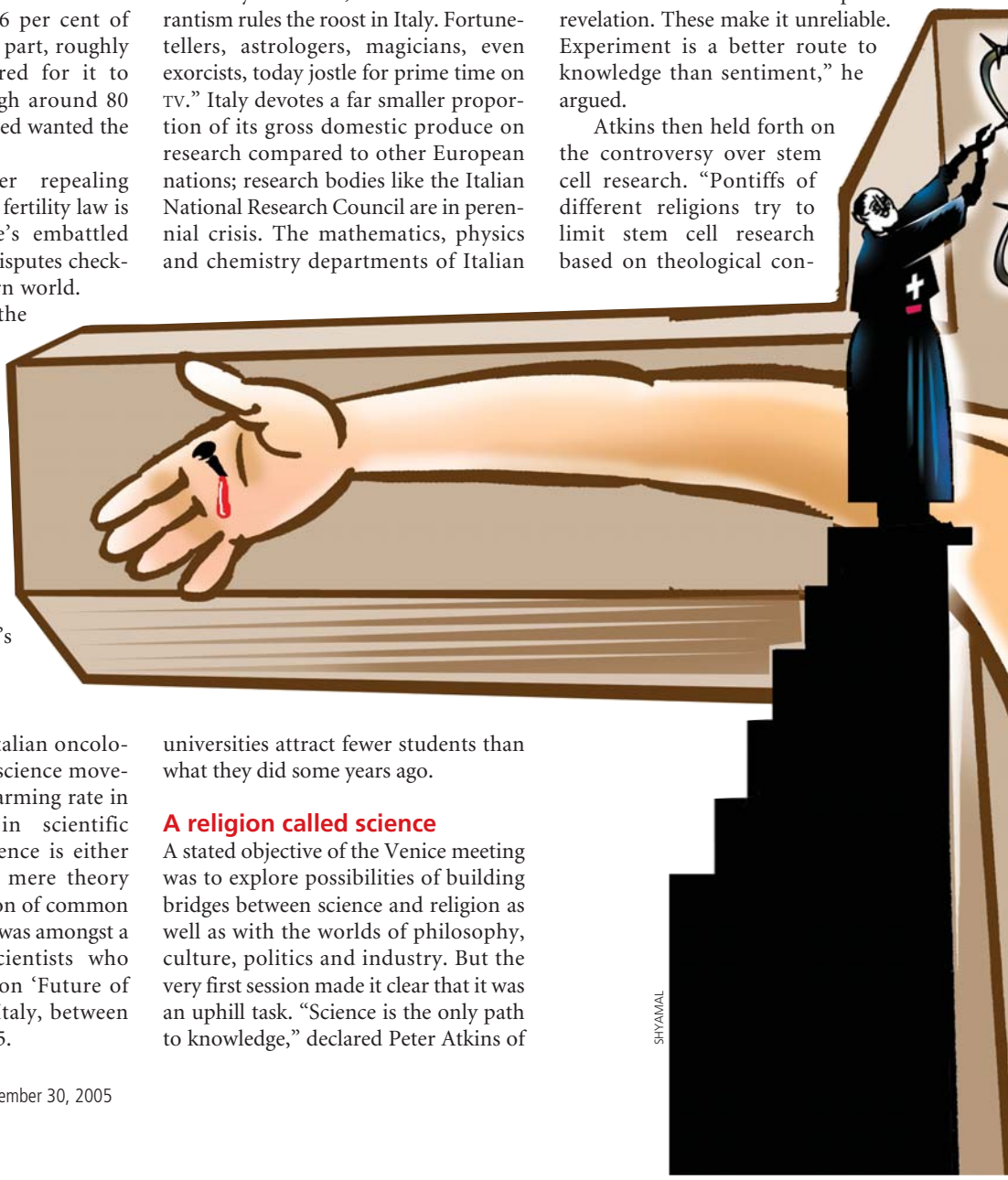
Umberto Veronesi, an Italian oncologist, laments, "The anti-science movement is growing at an alarming rate in Europe. Investments in scientific research are falling. Science is either perceived as amoral or mere theory beyond the comprehension of common human beings." Veronesi was amongst a group of concerned scientists who organised a conference on 'Future of Science' in the Venice, Italy, between September 21 and 23, 2005.

"We proposed a dialogue between scientists and the society. Freedom, universality and criticism, are values inherent to science. So, it can be a powerful antidote to intolerance and a good starting point for dialogue between different cultures," says he.

Italy, with its history, was an apt venue. Once the harbinger of the European Renaissance, it's today overtaken by a virulent anti-science movement. Says Veronesi, "All kind of obscurantism rules the roost in Italy. Fortune-tellers, astrologers, magicians, even exorcists, today jostle for prime time on TV." Italy devotes a far smaller proportion of its gross domestic produce on research compared to other European nations; research bodies like the Italian National Research Council are in perennial crisis. The mathematics, physics and chemistry departments of Italian

the University of Oxford, UK, sharing forum with representatives of Christianity, Islam and Buddhism. "Religion only provides a soft cushion to our lives, while science provides hard basis for what we think and do," he contended. Atkins then went on to elaborate the core features of science that make it reliable: insistence on experiment and its public character. "In contrast, the core features of religion are its reliance on sentiment and on private revelation. These make it unreliable. Experiment is a better route to knowledge than sentiment," he argued.

Atkins then held forth on the controversy over stem cell research. "Pontiffs of different religions try to limit stem cell research based on theological con-



universities attract fewer students than what they did some years ago.

A religion called science

A stated objective of the Venice meeting was to explore possibilities of building bridges between science and religion as well as with the worlds of philosophy, culture, politics and industry. But the very first session made it clear that it was an uphill task. "Science is the only path to knowledge," declared Peter Atkins of

SHYAMAL

ceptions. It is deplorable that ancient sacred texts are used to dictate research on medicines. It works to the detriment of human health," he said.

Atkins had a supporter in Lewis Wolpert, professor of applied biology at University College, London. "There is no evidence that the early embryo is a human being — as believed by religions — as it can give rise to twins," he said.

But, some other scientists at the gathering took the middle path. "There is a lot of common ground between the worlds of religion and science. The basic enquiry is same: to locate humankind in natural and cosmological processes. Science has one answer to this query. Religion, on the other hand, offers another," said Predhiman K Kaw,

director, Institute for Plasma Research, Ahmedabad. In a similar vein Y S Rajan, former executive director, of the Delhi-based Technology for Information Forecasting and Assessment Council, said scientists who refuse to engage with religion are "theologians of science".

Find a meeting ground

Rajan asserted: "The entire debate revolves around big religions. But we have thousands of religions and cultures. These have survived for long because they offer something good to humanity. We should find meeting grounds with these cultures. Then a dialogue might ensue."

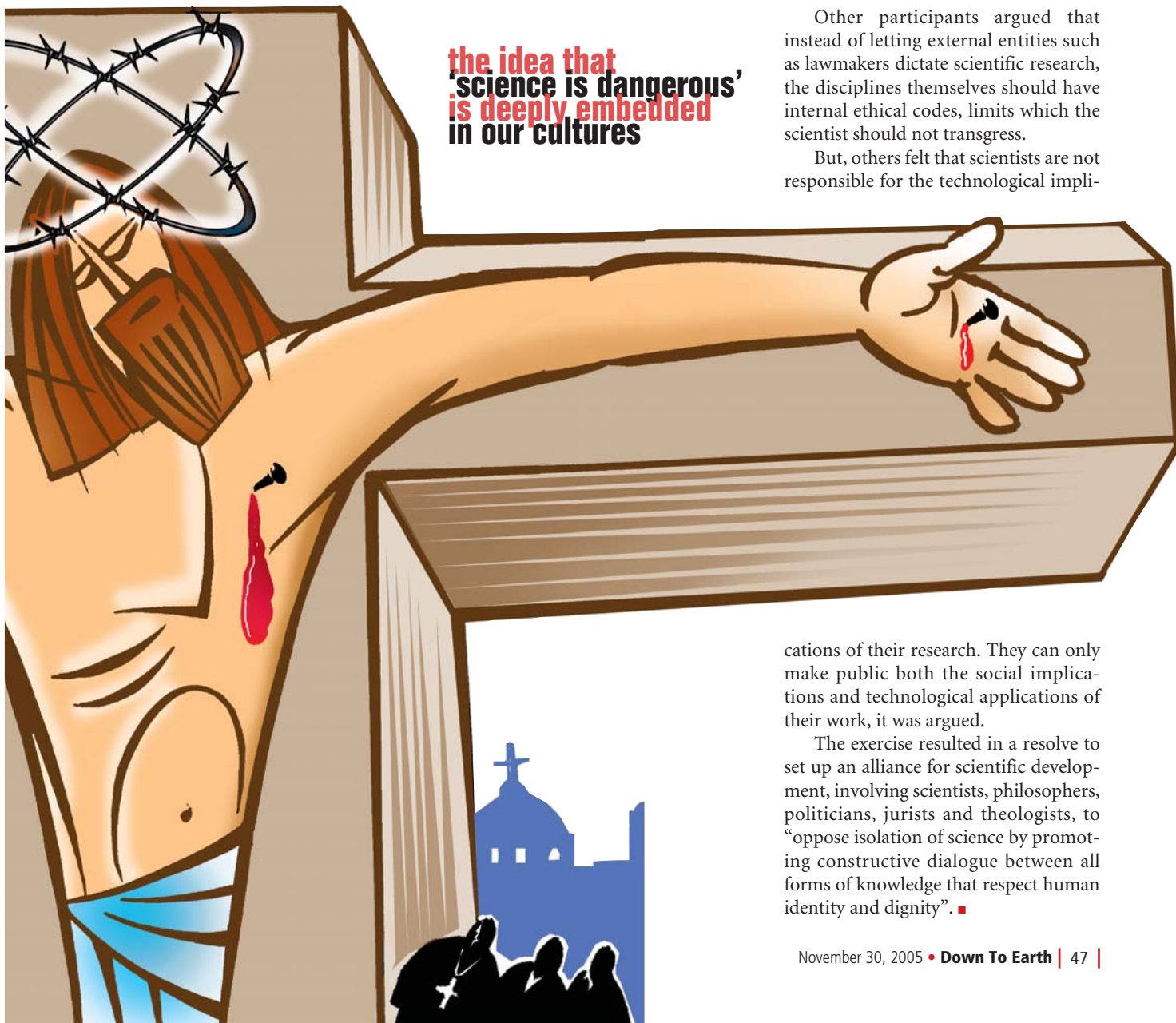
But Wolpert noted, "the idea that 'science is dangerous' is deeply embed-

ded in our cultures. Mary Shelley's *Frankenstein*, Goethe's *Faust*, and Aldus Huxley's *Brave New World* reflect this animus. It's difficult to find a novel in which scientists come out well or a film that's sympathetic to science. The image of Frankenstein has been turned by the media into genetic pornography," he rued. Deriding bioethics as a "growth industry" and lampooning opponents of cloning as "moral masturbators", Wolpert said, "cloning, stem cell research and gene therapy do not involve any new ethical issues". He said no area of research is socially sensitive so as to proscribe research. "And in any case," argued Wolpert, "we should rely on the many institutions of a democratic society: parliament, a free and vigorous press, affected groups, and the scientists themselves."

Other participants argued that instead of letting external entities such as lawmakers dictate scientific research, the disciplines themselves should have internal ethical codes, limits which the scientist should not transgress.

But, others felt that scientists are not responsible for the technological impli-

**the idea that
'science is dangerous'
is deeply embedded
in our cultures**



cations of their research. They can only make public both the social implications and technological applications of their work, it was argued.

The exercise resulted in a resolve to set up an alliance for scientific development, involving scientists, philosophers, politicians, jurists and theologians, to "oppose isolation of science by promoting constructive dialogue between all forms of knowledge that respect human identity and dignity". ■

A house for the islander

Illogical plans for post-tsunami housing on the Andaman and Nicobar Islands omen trouble



SHARBENDU DE

A year has passed since the killer tsunami devastated the islands, but the Rs 600-crore corpus set aside by the Central government for rehabilitation of those who lost their homes, is yet to be utilised. The reason: the Centre can't make up its mind on the design for tribal housing, caught as it is between proposals from its own building agencies and from non-governmental organisations (NGOs). While the NGOs are lobbying hard for their model of traditional timber houses approved by the Planning Commission and the home ministry, the Centre's building agencies — such as the National Buildings Construction Corporation Limited, the Central Public Works Department and others — are pushing for the steel-and-prefabricated prototype houses that they have already put up on the islands.

Considering the minimum forest cover that has to be maintained in the islands, timber is scarce. Cement, on the other hand, is brought from the mainland and is abundantly available. But the question here is — is this a conflict about using timber or cement, or — more seriously — a clash of interests?

Let us consider the case of timber first. Approval to timber-based models will certainly benefit the people, NGOs as well as the contractors through whom they do their work. What could be the NGOs' interest in this?

Most of them have raised mind-boggling amounts through their 'tsunami relief appeals', which they have to spend now. Infrastructure rebuilding is

a direly felt need, and the money can certainly be directed towards it.

But NGOs working on the islands might be carrying their own baggage of individual organisational mandates, perspectives and vested interests — seasoned and coloured by their experiences in different situations; this baggage might not necessarily be apt for the islands.

Do the people on the islands want timber houses?

Until last year, they, especially the tribals, have been living in traditional, culturally accepted, wooden stilted houses. During our discussions with the

islanders would live, have never lived on an island themselves and have carried along the burden of 'mainland' mentality throughout their lives.

There are, consequently, other questions that arise here: who will benefit from the construction projects and how strong are their interests? How much is at stake?

Contractors, public works department officials, bureaucrats and politicians — all stand a chance of claiming a share of the Rs 600-crore booty. We need to start looking at the details, at the faces behind the façade, so to speak: the contractors bidding for the projects,

The Union ministry of urban development is rooting hard for concrete and steel-based prefabricated structures



islanders just after the crisis, most mentioned how their wooden houses did not fall apart and therefore, expressed their preference for timber constructions.

However, having said this, I must also point out that there were those among the victims as well who viewed this disaster as an opportunity for transiting towards a new lifestyle.

Coming to the business of cement and construction, the government's infrastructure-building machinery under the Union Ministry of Urban Development is rooting hard for the concrete or steel-and-prefabricated structures. But these, if accepted, will not be suitable for the islands. In all probability, those who are deciding the kind of kennels in which the

the government bodies which wish to have a finger in the pie, and the political representatives who are in it too by virtue of their 'proximity' to these interested parties.

Instead of trying to satisfy any of them, the authorities should raise the fundamental question: why are we making these constructions and whom are they meant for? Once they start asking questions, the answers — I believe — will begin rolling out, though slowly and painfully. The people's opinion on what type of houses they want is crucial here, and should be sought. ■

Sharbendu De is an environment writer and photographer, and has been working on the Andaman and Nicobar Islands

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Initials. _____

Power to the environment

India needs to rethink its power generation strategies for the sake of environment



PRABHAKAR SINGH

If humans desire to live for many more centuries to come, they have to take desperate steps to protect the environment. The socio-economic health of civilisations depends on it. A case in point is that of the power sector. India faces a huge energy deficit: till 2001, only 44 per cent of Indian households had access to electricity. But consumption's galloping: between 1947 and 2001, India's per capita power consumption rose from 15 to 592 units.

If India has to move ahead economically, it must find ways to bridge the deficit. The generation of energy, however, exerts significant environmental impacts. The efficiency of a thermal power plant, for instance, averages about 33 per cent, which makes it necessary to release — externally — about 2 kilowatt (kW) hours of energy for every 1 kW hours of electricity generated. It is in this external release of power plants that we find contents of potential atmospheric pollution and release of greenhouse gases (GHG). In fact, the power sector in the country accounts for 51 per cent of India's total GHG emissions. India also happens to be the fourth largest emitter of GHGs in the world. Is it possible to meet the growing demands of an energy-driven economy and yet ensure that the environment is not harmed?

India is a signatory to Kyoto Protocol. But under the protocol, there is little incentive for far-reaching climate protection measures in countries like India. The Protocol's Clean Development Mechanism (CDM) can

only finance low-emission projects, and currently has no means to support emission-reducing policy changes; therefore, it cannot deliver society-wide programmes. It is not obligatory for India to reduce emissions of GHGs immediately, but the country should demonstrate a moral commitment to solve this environmental concern by taking care of emissions due to its generation of electricity. India needs to develop alternative energy sources.

To be fair to our planners and administrators, we have begun making the moves. The Environmental Impact Assessment (EIA) notification, 1994 has

setting up of parallel transmission and distribution lines within the same area as the existing monopoly.

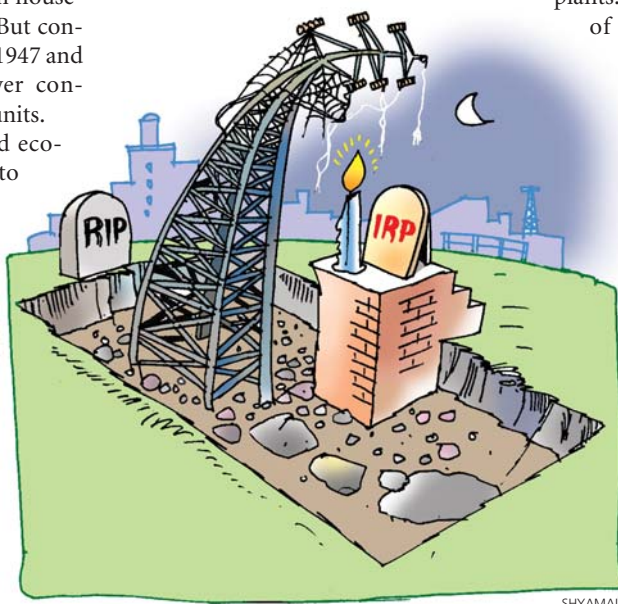
But the potholes persist. Efficiency, decentralised generation or switching of fuels are not integrated in our power planning process. Implementation of the EIA methods is deeply flawed. India has set a target of generation of 10,000 MW through renewable energy by 2012, but a US \$3.43 billion worth of investment is required to fully exploit this sector. Currently, the Indian government invests a meagre US \$0.20 billion.

India's problem is that it mostly relies on conventional power generation plants. Its plans focus on quick addition of generating large capacities and concentrate on finding financial resources for rapid expansions. The required investment is mind-boggling — around Rs 90,000 crore per year. India's plans tend to ignore other options, especially those of energy conservation.

What is required in this scenario is integrated resource planning (IRP), which will enable all available options for power generation or saving to be treated at par. Along with coal, gas and hydro plants, the portfolio of options that can be considered includes decentralised power generation such as windmills, wood gasification-based peaking plants, distributed micro-hydel plants, substitution of electricity with gas, or energy conservation in homes, shops, farmlands and factories. IRP works out the potential as well as the costs of all these options. It is estimated that adoption of IRP can reduce capacity addition — by 40,000 MW — and increase supply.

Clearly, India cannot shrug off its environmental responsibilities. ■

Prabhakar Singh is a student of the National Law Institute University (NLIU), Bhopal



SHYAMAL

been introduced to check irreversible damage to environment by large projects. The Energy Efficiency Act was passed in 2001, and a Bureau of Energy Efficiency under the Union ministry of power has been constituted. A separate ministry now looks after non-conventional (renewable) energy sources, and rural electrification has come back to the political centrestage. The Electricity Act, 2003 has been passed to allow a much larger role for market forces in the power sector. It imposes a deadline for unbundling and corporatisation of all state electricity boards, and enables the

The ultimate subversive

Former President K R Narayanan made power good

SUNITA NARAIN

Some people can rebel outside the system; most conform within the system. Few people can be true to themselves when they are in power. But very few — almost none — can revolt from within and remain true to others, when in highest power. It is not that they don't want to. They can't because of the sheer weight and scale of the office they hold in government. They can't because they are not K R Narayanan, our former President who passed away this last week.

You will be surprised when I write this. K R Narayanan will not fit your image of the strident, card-holding, revolutionary leader. Instead you will remember him for what he was — the erudite, compassionate, graceful politician, who knew his mind. You will remember him for his integrity and for his reluctance to play the power game. You will remember him fondly and dearly for all this and more.

I remember him for all this and even more. I remember him for making the system 'bend' to make space for issues, people, ideas and what was right. He did this in his own style; giving of little of himself to what he believed in. Most importantly, he did this not by standing against the system, but by standing with the system. He was the ultimate subversive: he made power good.

In the mid-1990s, he was already vice-president, living in the distant and security laden areas of Delhi. My colleague Anil Agarwal, of whom he was very fond, asked if he would release a book on air pollution. Sounds innocuous, does it not. After all, this is what all leaders are expected to do — launch books, shows, seminars and cut ribbons and lay foundation stones for bridges, buildings and blocks.

But this was not one of 'those' events. The book was titled *Slow Murder*; it indicted the most powerful industrialists in the country for producing vehicles that killed people slowly but surely; it demanded change with stridency of an angry rebel. This was also the time when Delhi was choking on the spit of its vehicles; but it was the time when nobody cared.

K R Narayanan not only agreed to release the book, he agreed to do it from his own palatial and powerful vice-presidential house. In one stroke, the profile of the concern changed. It became acceptable. It became powerful.

Later, Anil went back to K R Narayanan — this time in the grandeur and silence of the President's house to

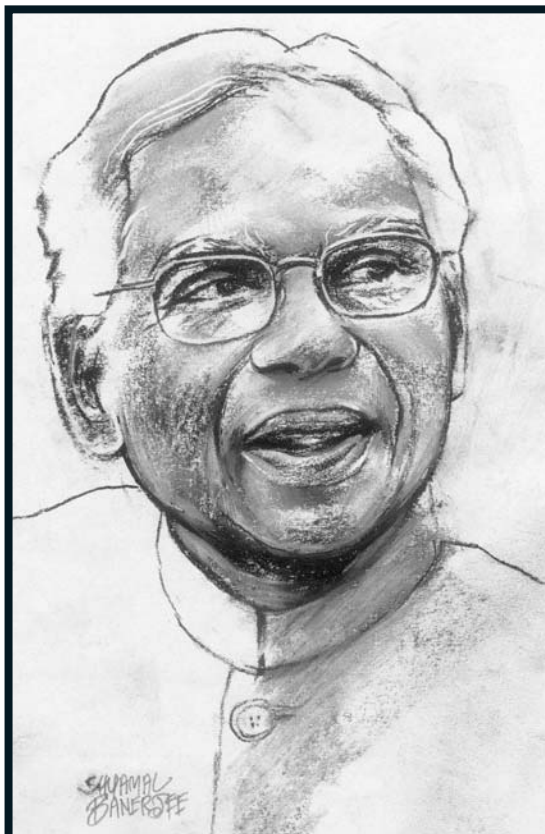
request him to inaugurate the workshop on traditional water harvesting. Again, you will say: so what is new. What was different was that this was the time when water harvesting was the small fad of small people. K R Narayanan agreed to inaugurate the meeting to give away awards to these small people — the unsung engineers and water managers of rural India; he agreed publicly to learn from this knowledge so that the most powerful house in the country would adopt their humble science. He agreed in the meeting that "he would do water harvesting in Rashtrapathi Bhawan (the President's Estate), provided his bureaucracy would allow him". And he did. My fondest memory is of him, inspecting the rainwater harvesting recharge wells of the President's Estate, accompanied by his bewildered but respectful government engineers.

Still later, he agreed enthusiastically, to visit the still unknown villagers who had brought their river to life by rainwater harvesting. His visit

to Alwar to award Bhaonta-Kolyala village brought with it the pomp of the state — the governor, chief minister and others trekking to the river to see the water that gave it life.

We should remember how he admonished the government of the need to build an inclusive and just society. How he spoke of the need to account for people displaced by dams or devastated by mining. He did this, not when he was out of power or in retirement — as most do — but when he was holding the reigns of India's highest office. Today, we need this voice of authority and reason more than ever, as we hurtle towards growth, which can be all we want it to be: divisive and destructive or bring prosperity for all.

This is why I cried at his death: a good man who made us all good has gone. We are poorer, much poorer at this loss. ■



K R NARAYANAN
1920-2005



REPORT >> ENVIRONMENTAL STATUS REPORT, 2004-2005 • Pune Municipal Corporation

How shoddy can we get

The twelfth schedule of the 74th amendment to the Constitution of India made it mandatory for the municipal corporations to prepare environmental status reports by July 31 every year. Pune Municipal Corporation has been meticulously publishing this report for the last ten years. Unfortunately, the corporation refuses to look upon it as an opportunity, preferring to consider it a 'task'. The Environmental Status Report (ESR) 2004-05 bears the stamp of this attitude.

The account

Following an expected trajectory, the chapters begin by introducing city profile, demography and economy, housing and slum, health and, interestingly, education. This chapter has everything on education but environment.

The chapter on traffic and transportation has got lots of useful facts, figures and numbers for researchers, though the same doesn't hold for the text that follows. It explains how two-wheelers have doubled since 2001. That Pune has a low share of public transport and obviously higher share of private transport, symptomatic of the country. The report tries to formulate criteria for environmentally sustainable transport. While a section on "Cycle Track and 'Bus Rapid Transit' System for Pune City" reads well for a change, you suddenly realise that the section is incomplete. A typographic error perhaps, but it takes a lot away from the report.

Breathing low

The chapters on water, solid waste and wastewater will disappoint the reader. They present only the details of the pumping stations and the treatment plants, there is no mention of the distribution network. The city's water sources are not clearly mentioned. Pune's dependence on groundwater and

the long-term trends in groundwater levels or quality do not even find a mention in the ESR.

The lack of details and data analysis leaves a lot for the reader to assume and interpret. For instance, wastewater generation as per the report is 451 million litres per day (mld). But based on water supply range offered by the report, waste generated would vary from 470 mld to 637 mld. Half the story! Industrial waste and waste generated from groundwater use is not even considered. Status of treatment plants,

aspect of the report is the absence of detailed analysis on vehicular pollution, baring those colourful graphs and tables. A lot of work has been done on mobile source air pollution, which surprisingly finds no mention in the ESR. Many international agencies have been working in the Pune region. The work done and the way ahead could have made an interesting read.

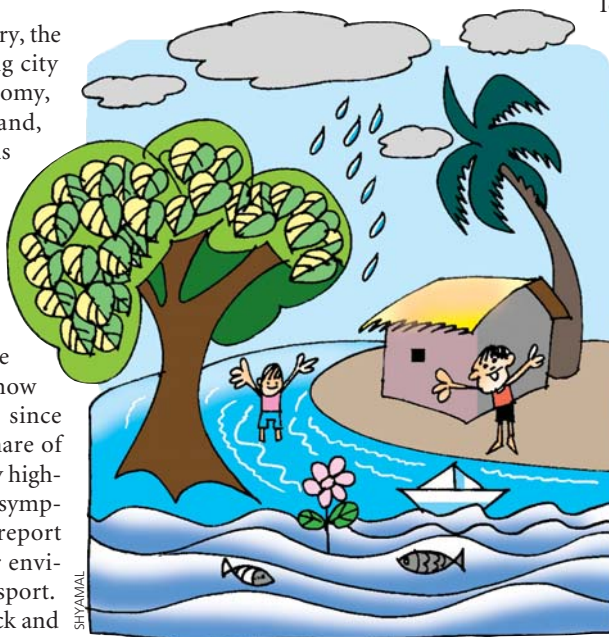
The motive of chapter 14 — Action Planning and Environment Management — is unclear. In a section, 'Setting Goals and Objectives for Task Identification,' there is no mention of vehicular air pollution!

Who checked the quality?

One doesn't comprehend where a chapter ends and how a new one begins: for a change the reader has to look down and not up for an impending chapter. The editing leaves much to be desired. I can't resist giving, not one but three examples. For instance, at one instance the estimated population is 3006036 and just below this figure, estimated population figure is quoted as 3060036! On the same page there are two different figures for female population. And finally the report says, "The working age group is a detrimental group to the city with its economic development dependent on

them". One can overlook all this given that barely three months went into the report, but should we?

I don't really understand (so will you if you happen to read the report) if the report has been prepared to generate environmental awareness, and address environmental concerns or is it just because the 74th Amendment Act of 1992, requires a municipal commissioner to table a report on the Status of Environment before July 31, each year. Only Pune's municipal corporation can tell. ■



quality of treated effluent, and its disposal or reuse are vaguely depicted. The reader is left to empathize the differential. The water pollution write up throws up some interesting finds. For starters, dissolved oxygen value (DO) in a waterbody increases with a decrease in the value of biochemical oxygen demand (BOD). The water quality data of the Mula-Mutha rivers shows that BOD during May 2004 was zero at Vithal Wadi, but the corresponding DO value is 1.00 milligramme per litre. Any takers?

Perhaps the most conspicuous

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ADVERTISEMENT >> PLASTICS • Mumbai

Plastic interest

The Maharashtra government's proposal to ban plastic bags has galvanised the plastic industry into action. The Indian Centre for Plastics in the Environment (ICPE), a non-governmental organisation (NGO), has taken up cudgels on behalf of the industry by issuing quarter-page advertisements in various Mumbai newspapers — in public interest, they claim. One such ad shows two poor women cooking food on a *chullah* with a small child besides them. The ad reads: "Two simple habits will ensure their health isn't threatened by adulterated oil." Another ad shows barren land with four chopped trees. This one reads: "Two simple habits will ensure that this isn't the Earth your children inherit." The ads then go on to explain their point: plastic bags, they claim mean a lot to the 'common man' because "hygienic plastic pouches reduce the risk of adulteration [of cooking oil] at a minimal cost."

Alternatives to plastics are criticised as expensive and if adopted "trees will be felled in larger numbers". So far, so good. But if the ICPE is to be believed, two simple habits can solve all plastic-related problems. One, keep dry and wet



TWO SIMPLE HABITS WILL ENSURE THEIR HEALTH ISN'T THREATENED BY ADULTERATED OIL.

Have you given thought to what a world without plastic could mean to the common man? Using toxic oil poses many health hazards including fatal diseases like Dropsy. To prevent such tragedies the administration has mandated the sale of packaged oil. Hygienic plastic pouches reduce the risk of adulteration at a minimal cost. While those who consume 'extra virgin olive oil' may not see this as a problem, for a larger percentage it could mean falling badly ill. Do your bit for them by using plastic bags responsibly.

1 SIMPLE HABIT TO FOLLOW

1. Keep dry and wet wastes segregated. Dry waste (plastic, paper, glass etc.) can be recycled and the wet waste (food waste, vegetable etc.) can be composted into manure.
2. Use thicker plastic bags that are suitable for re-use.

INDIAN CENTRE FOR PLASTICS IN THE ENVIRONMENT
www.icpeindia.org

PLASTIC IS FOR EVERYONE. ENJOY IT RESPONSIBLY.

plastic truck and simply dumped. Though on paper, two separate trucks were designated for wet and dry waste, in reality no one cared." Patil adds that the municipal workers then segregate the recyclables from the mixed waste and sell it for a tidy sum. Shouldn't the plastic industry spend some energy and finance on tackling such real issues, rather than issuing ads. In public interest, that is. ■

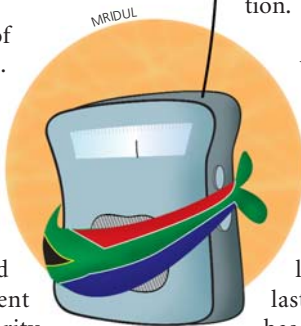
wastes segregated; the former can be recycled and the latter composted into manure. Two, use thicker plastic bags that are suitable for re-use. The plastic industry has been sermonising on these habits for many years now. It hasn't solved any problem. How could they when municipalities work against segregation? Sunita Patil of Stree Mukti Sangathan, an NGO working with Mumbai's over 2,000 women waste pickers explains: "The Municipal Corporation of Greater Mumbai did give bins to households to segregate waste. But this segregated waste was again mixed up in the municipal

RACISM >> RADIO STATION • South Africa

No racist bunkum

It was a sinister votary of racism. Not any more. South Africa's all-white enclave town of Orania has lost its radio station: Radio Klub 100. Lydia de Souza, senior manager of broadcast licensing, monitoring and compliance, Independent Communications Authority of South Africa (ICASA), said the mon-

itors who surveyed the station found it "very racist". ICASA says, however, that it was the lack of a licence, rather than the content of its broadcasts, that prompted the closure of the station.



Fearful that majority rule would threaten their way of life, a few white descendants of Dutch and French settlers bought an entire town in the semi-arid Northern Cape in the early 1990s. Orania launched its own currency last year but the government has refused to grant it the autonomy it seeks. ■

CENSORED >> SWAN KILLING VIDEO • Chile

Partners in crime

The international environmental watchdog group Oceana is using the Internet to disseminate a video on the death of hundreds of swans at the Rio Cruces nature sanctuary in southern Chile after its public screening was censored.

Sara Sinsay of Publicitaria, the company that owns the theatre where the video was scheduled for display, initially reported that the Santiago municipal authorities had imposed the ban, though she later retracted the statement.

According to activists of the US-based ocean watchdog, Sinsay asked Oceana to send a version of the video that did not show individuals "publicly linked to the destruction of the sanctuary," including former Chilean president Eduardo Frei, whose administration authorised the construction of the pulp mill blamed for the death of 500 swans and the migration of another 3,000. ■

NEWS SNIPPETS

- >> Traditional owners from Northern Territory, Australia gathered outside Lucas Heights nuclear reactor in Sydney to rally against plans to place a nuclear waste facility on their land
- >> All new and renewed US passports will contain radio frequency identification chips that will include a digital photo and all other information currently printed in passports. Technology experts say that the data on the chips, which will be read at a short distance by electronic devices in a passport-control booth, could be electronically intercepted and potentially misused

LAWSUIT>> INTERNET CONTROL • The US

Big daddy watching

Civil rights groups in the US have challenged the country's new Federal Communications Rules (FCR). The rules scheduled to take effect in May 2006 will make it easier for law enforcement to monitor e-mails and Internet-based phone calls. The civil rights groups argue that the rules would force broadband Internet service providers, including universities and libraries, to pay for redesigning their networks to make them amenable to court-ordered wiretaps. "For the government to design any technology, much less the Internet, to be surveillance-friendly is against privacy and free speech," said Lee Tien, a senior staff lawyer with the Electronic Frontier Foundation, a nonprofit privacy rights group.

The FCR rules require broadband



Internet providers to design their networks so they can quickly intercept communications and deliver them to the government when presented with a court order.

"It is clearly not in the public interest to allow terrorists and criminals to avoid lawful surveillance by law enforcement agencies," the US Federal Commission of Communication wrote in its order. Opponents, however argued that the law could cripple the evolution of the Internet by forcing engineers to design products that can be easily monitored by the government. ■

FILM>> GYPSIES • Tamil Nadu

Tightrope walkers

The Kazhaikoothadi community in Tamil Nadu, which makes a perilous living by street performances such as tightrope walking and leaping through rings of fire, has found some support. Students of the Softview Visual Communications institute have made *Kalai Pookal*, a powerful film that explains the difficult livelihood of the

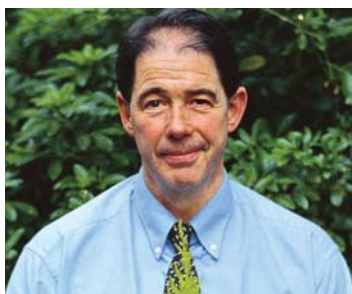
community, the promise education holds for their children and the thwarting of that promise by the lack of community certificates. The team that directed the film — B Arun, J S Avinash and K Raghuraman — has reserved its attention for the biggest concern among the Kazhaikoothadi community, that about the next generation. The biggest obstacle on their path to higher education is the absence of official recognition of their caste. When asked about their origins, members claim that they came from Gujarat many decades ago. ■

BOOK>> ENVIRONMENTAL MOVEMENT • The UK

Porrit's new clothes

The founding father of the British green movement has launched a startling attack on his fellow campaigners for failing to tackle the world's environmental problems. He has admitted that his own tactics have also been at fault. In a recent book, *Capitalism: As if the World Matters*, Jonathon Porritt describes the green movement as "too narrow, too technical, too anti-business, and often too dowdy". Porritt, now a

From
dissenter to
consultant:
Jonathon
Porritt



government adviser, claims the campaigners must take some blame for the continued failure to stop climate change and habitat destruction, because their overly negative approach has alienated

ONLINE

www.povertyenvironment.net

THE POVERTY NET

Launched on 23 September 2005, the website tries to promote poverty-environment initiatives by providing a dedicated platform for collecting and sharing knowledge and experience on the poverty-environment linkages and the lessons learned in responding to poverty-environment challenges. Established on a neutral domain, it is funded through the Asian Development Bank's (ADB) Poverty and Environment Programme and co-financed by ADB and the governments of Norway and Sweden. As the website claims, it "...seeks to foster collaboration with all potentially interested poverty and environment stakeholders from Asia and other parts of the world..."

The user can search documents under different focal areas (natural resource, pollution and health, environmental vulnerability), region (Asia-Pacific, Americas, Middle East, Europe, Africa) or country or just by using a simple built-in search engine. The website is an important information source on poverty-environment linkages, which has been neglected for a long time but receiving increasing focus now. On the downside, the site seems to advocate too much for achieving the Millennium Development Goals to eradicate poverty. However, it offers opportunities for its users to share any information and knowledge on poverty-environment relationship. The website also encourages NGOs, academic/research institutions and other developmental agencies to share innovative experiences.

politicians and the public. The former head of what is now the British Green Party said the problems go back to the origins of the movement, in "saying no in a way that became part of the culture of the movement". "If you consider the way the environmental movement portrays climate change, it's the end of the world as we know it," he said. "In reality, climate change could provide a stimulus to an extraordinary shift in the economy [and] it could improve people's quality of life." Clearly Porritt has donned a new hat. ■

A safety valve!

Alarmed by super rapid industrialisation in Asia and the Pacific, the Asian Development Bank suggests urgent corporate 'voluntary' action and diluted regulations

Economic growth in Asia and the Pacific over the past 15 years has been truly impressive, and it has resulted in a significant reduction in income-based poverty across much of the region

"However, expanded economic activity in and outside of the region has placed tremendous strains on the environment, which has undermined some of the development gains achieved due to the negative health impacts of urban air and water pollution and degradation of natural systems upon which a large portion of the rural poor depend for their livelihoods. As Asia and the Pacific already is the most populated on the planet, the scale of these environmental consequences is large enough to be of regional or even global concern"

Between China and India, two giants in Asia, population considered to be middle class is estimated at 550 million. And it is increasing! Their consumption pattern is bound to effect environment in a negative manner

The present mode of 'command-control' by state, irrational standards, low capacity to monitor and implement standards are not working out.

A mythology: The initial stage of industrialisation is bound to create havoc on environment in terms of inefficient resource use and pollution sink. When wealth is created, environmental problems will be tackled

[WISDOM]: Price of corruption is always cheaper than cost of compliance

[NEWS]: Global integration of business and rising pressure from internation civil society will not allow unsustainable business anymore. Local communities are protesting. Stock exchanges, share holders and investment companies are getting sensitive to **adverse publicity**

[REALISATION]: There is a business opportunity in environmental clean up and management, and that can be used as the guiding force for sustainability! **The Asia-Pacific market is estimated to account for us \$37 billion of the [2005] global market...[and is] expected to triple by 2015**

Asian alarm: In 2003, China alone consumed **half** of the world's cement output, **a third** of its **steel**, **a quarter** of its **copper**, and **a fifth** of its **aluminum**. With respect to personal consumption, around **35 per cent** of the world's **cigarettes**, **20 per cent** of **mobile phones**, and **23 per cent** of **tv sets** were sold in China

"Grow now-clean up later"
approach to the economies
and environments.

Region	2005 (Actual)	2015 (Projected)
Japan	93.1	95.6
Australia + New Zealand	9.8	14.0
Rest of Asia	37.5	116.4
Global	607.4	836.1



A sad reality: The state has limited resource to ensure a clean environment.

> **A noble intention:** Private business sector has to increase its role in striking a balance between nature and exploitation of nature it undertakes.

> **A convenient conclusion:** Private sector will ensure sustainability on a voluntary basis, without regulations. And the environmental responsibility should be guided by market driven imperatives.

Source: Making profits, protecting our planet; corporate social responsibility for environmental performance in Asia and the Pacific, Asian Development Bank, 2005

ON PAPER

India's pulp and paper industry has two faces. It's an environmentalist's nightmare, given its voracious appetite for natural resources and its highly polluting nature. On the positive side, this sector has the potential to generate sustainable employment and contribute to afforestation efforts.

How can this environmentally sunset industry become a sunshine one? What are the most environment-friendly units in this sector in India doing? What are the global best practices? What's the way ahead?

Find the answers in '*All About Paper*' – a comprehensive review of India's pulp and paper industry conducted in a span of two years by the Centre for Science and Environment's Green Rating Project team. The book contains an in-depth analyses on all issues concerning the pulp and paper sector's environmental performance, explained with the help of easy-to-grasp graphs, charts, facts and figures.



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The figures are there, but the tigers aren't. Despite the official claims, there are not many tigers left in India. We can choose to save them, or we can keep counting. For more information, log on to www.cseindia.org