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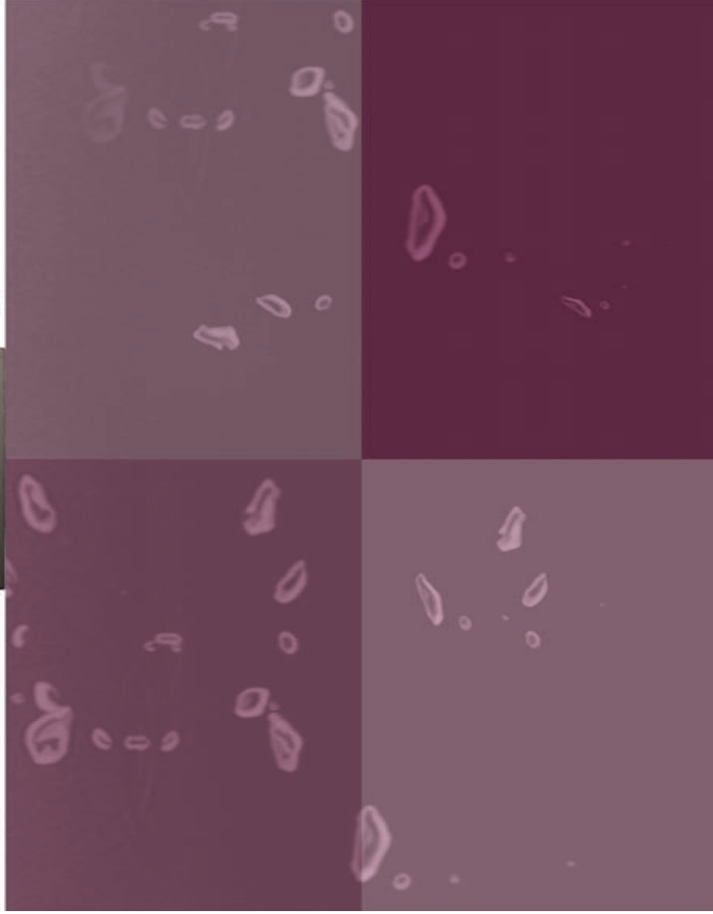
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COVER PHOTO: NEHA SAKHUJA



Hiware Bazaar—a model village

This is in response to your editorial 'The laboratory of development' (December 31, 2007). It is heartening to read that the residents of Hiware Bazaar village brought about a remarkable change in their lives by simply noting water availability for a certain period of time and calculating their water requirements for both irrigation and domestic use.

Proper planning of water use done well in advance is their key to success. The village *sarpanch*, Popat Rao Pawar, has been rightly honoured. But I believe that all residents of Hiware Bazaar deserve to be honoured for abiding by the *gram sabha* decisions. Such village models should be promoted and replicated across the country.

SUKHADH

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➔ I firmly believe that Hiware Bazaar village in the drought-prone district of Ahmednagar in Maharashtra can be a model for others. During the 1990s, I presented a paper at a conference in Stockholm, Sweden, to demonstrate the importance of tailoring the economy to suit water resources availability. My paper corroborates your experience at Hiware Bazaar.

GEOFFREY J MATTHEWS

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➔ I am glad that you visited Hiware Bazaar and wrote an article on its water audit. In May 2007, I accompanied some members of the International Association of Hydrogeologists, who were on a short visit to India, to meet Popat Rao Pawar and get first hand impressions of the miracle achieved by

soil and water conservation practices followed over a watershed. They were highly impressed.

However, they asked me a question: "Why don't other villages in the semi-arid region of Maharashtra follow the example of Hiware Bazaar and make the state 'tanker-free' in summers?"

In Maharashtra, there is a strong tanker lobby benefiting from supplying 'tanker water' for drinking in water-scarce villages. If the state government actually wants to take positive steps to mitigate the problem, it should declare that the villages will get water tankers only for four years. Within this period, water-scarce villages must undertake soil and water conservation activities and be self-sufficient at least to meet their drinking water requirements.

Or else, villages like Hiware Bazaar and Ralegan Siddhi will remain stray examples.

SHRIKANT D LIMAYE

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➔ It is unfortunate that the current definition of development in our country is nothing beyond laying new roads and establishing more industries. As a result, our new economic activities are more concentrated in urban India, while development of villages, which constitute 70 per cent of the country, get short shrift.

In such a scenario, the efforts made by villagers in Hiware Bazaar and Ralegan Siddhi are certainly commendable. The methods they have adopted are so simple that any village can follow them easily.

The government should publicize the achievements of these villages so that they can inspire other villages, particularly places like Vidarbha in Maharashtra and Rayalaseema in Andhra Pradesh, which are experiencing increasing incidences of farmers' suicides.

V S NAIDU

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➔ Models of villages such as Hiware Bazaar and Ralegan Siddhi, as rightly said in your editorial, should be replicated across the country. But this, to a large extent, also depends on the attitude of local people.

Take the examples of Haryana and Punjab—two economically prosperous states. People in these states have over-exploited their groundwater. They understand the problem and probably the solution as well but no one wants to go for less-water intensive crops. They believe that environmental resources belong to everybody and one can exploit them as much as possible. At the same time, they fear that if they don't take it, others will finish it. To replicate the success of Ralegan Siddhi, we need many Anna Hazares.

PRADEEP KUMAR

Van Bhawan, Sector-6, Panchkula, Haryana

➔ In your editorial, you have rightly raised the question that how to replicate models like Hiware Bazaar.

Often, our policymakers, impressed by the success of such models, tend to go ahead with large-scale projects based on them. Fair enough. But then why do those large-scale projects fail?

If we look at the model villages, their success is not because of a pre-designed and well-planned policy, but largely due to a strong visionary leadership.

Emissions puzzle

Is it true that emissions from a four-stroke engine contain finer particulate matter than that from a two-stroke engine?

If so, then don't you think that these particulate matters will be difficult to deal with, once they enter our respiratory system?

We know that diesel engines cause more pollution than petrol engines. Then, why are car companies announcing, with much fanfare, the launch of diesel versions of their cars?

C V KRISHNAMURTHY

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OUR RESPONSE

European studies show that two-stroke engines emit more particulate matters, up to six times higher, and nanoparticles than four-stroke engines.

Moreover, the nature of particulate matters from two-stroke engines is entirely differ-

This is unlike the government-sponsored models, where villages are given all the required infrastructure, but there is no vision.

Therefore, the question should be how to create good leaders. Can we really 'create' good leaders? I am not sure.

NAND KISHOR AGRAWAL
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➔ The editorial on Hiware Bazar juxtaposed to the Hirakud agitation was illuminating. I wish I had a Marathi version of this to distribute among my fellow villagers.

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Water rights

This is in response to the cover story 'Ground Swell' (December 31, 2007). The problem is not irrigation vis-à-vis industry. The problem is about managing the water sector. Both agriculture and industry are important for our economy and we need water for both the sectors. Hence it is up to the sectors to improve their water usage.

I have a few suggestions to make in this connection.

- Water entitlement criteria should be fixed for each type of industry. Water allocation should be calculated scientifically and be made public

- Industry should carry out its own water audit and try to reduce water consumption through advanced technologies and recycling of water

- There should be a substantial increase in water rates for industrial use based on the concept that water is an economic good

- Installation of water meters should be made compulsory for all industries

- The industry should also be asked to pay for rehabilitation, modernization and renovation of irrigation projects

- Farmers should be motivated to gradually shift to diversified crops, especially those that consume less water

- Farmers should also learn new paddy cultivation techniques, which require substantially less amount of water than traditional practices. This also applies to other water-intensive crops such as sugarcane and banana

- Farmers should switch over to piped distribution of water, instead of open channels for water distribution

PRADEEP PURANDARE
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➔ On November 6, 2007, 30,000 farmers from Orissa's Sambalpur district gathered to demand water from Hirakud dam. If the ongoing exploitation of water by industries continues, similar agitations will become more frequent and violent.

In the name of special economic zones, the government is blindly providing land, water and electricity to industries. What happened in Sambalpur is just a warning to the government to give a second thought to the real interest of common people.

GURU PRASAD NAHAK
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Who is to blame?

This is in response to the article 'Business in Bali' (December 15, 2007). Though climate change is a worldwide problem, rich countries such as the US, the UK, Australia and China are primarily responsible for the environmental catastrophe. Their actions can rightly be

called eco-terrorism. Developing countries such as India, Bangladesh, Nepal, Tibet, Sri Lanka have been victims of their eco-terrorism.

RANJAN KUMAR AMRITNIDHI
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➔ The analysis gives a clear insight as to what needs to be done by the rich and the poor countries and the crucial role India can play in reducing greenhouse gas emissions. In Maharashtra's Aurangabad district, we have come up with a forum called Mukta Samvad Manch, where we encourage people to go for reverse integration and go back to bicycles rather than motorbikes. We are in the quest of an alternative to the polluting vehicles and machinery to curb greenhouse gas emissions without disturbing our economic growth.

SUNIL JOGDEO
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An interest in pests

Your articles 'No pesticides' (May 31, 2006) and 'Don't show me the money' (November 30, 2007) are highly inspiring. I am an entomologist. Currently, my department is working on alternative and cheap methods of pest management. We are also planning to run a research and extension project in some villages of Bundelkhand in Uttar Pradesh, where we can test the methods of agriculture as described by villagers in Punjab and scientists in your articles.

SARBASIS CHAKRAVORTY
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ent—they are semi-volatile hydrocarbons and are largely influenced by lubrication. This means, with controlled lubrication one can reduce particulate matter emissions from two-stroke engines.

With the use of advanced technologies such as direct injection technology and catalytic converters, particulate matter emissions from two-stroke engines can also be reduced further.

As far as emissions from diesel and petrol engines are concerned, data from the Pune-based Automotive Research Association of India show that there is an enormous difference between the actual emissions levels of diesel and petrol cars, even if both are of Euro III (Bharat Stage III) standard. Euro III diesel car emits 7.5 times more toxic particulate matters than a petrol car meeting the same emission norms.

The difference is because of the flawed emissions standards that allows diesel cars to emit more NO_x and particulate matters compared to petrol cars.

Utility of nuclear power

I do not agree with the article 'Ticking away' (December 31, 2007). No doubt nuclear power sources have some problems. But this does not mean that we stop using nuclear energy for power generation.

The fear that the radiation from these nuclear plants will harm the neighbourhood is far-fetched. Disposal of spent nuclear fuel does pose a problem but there are ways to store them safely—deep in the used mines in sealed containers. There are several nuclear power stations operating across the world with an enviable safety record.

At present, when we want to combat climate change, there is an urgent need for non-fossil power facilities, and nuclear energy is the only source which is known to be less polluting despite all doomsday predictions.

Thermal power stations are polluting even with the best of technology and controls, and renewable energy sources such as solar, wind, tidal, geothermal and biogas have only limited applications.

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➔ I absolutely agree with the points made in your article. It is sad that those who are advocating the need of nuclear power do not even bother to ponder over the dangerous implications inherent in the deal. It is time that they should rethink over the issue before arrival of nuclear power in the country. Are we ready with the perfect solid waste management schemes to handle the nuclear wastes? How can we be sure that our policy makers are not pushing us towards another Chernobyl accident—the world's worst reactor accident that occurred at Chernobyl, Russia, in 1986.

ARVIND K PANDEY

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More study on acid rains

Your article 'Corrosive showers' (October 15, 2007) is an interesting report on acid rain.

The data from 10 global atmosphere watch network stations provided in the article are very informative.

You have also said that in most parts of India, alkaline dust in the atmosphere neutralizes the acid content in rain. This alkaline dust is a boon for us. However, with increasing emissions of sulphur and nitrogen in the atmosphere, I fear the situation might not be the same any more. It is time that researchers carried out a detailed study of acid rain once again. Highly ecological sensitive areas should be given prime focus in the study.

Also, there is an urgent need to estimate that how much dust contribution is from India and how much is due to the long-distance transportation of dust from neighbouring regions.

UMESH KULSHRESTHA

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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.
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From the highway the grave-stones were visible. Thirteen headstones, rough and blunt, carved with names of each dead tribal. Each stone was placed so that together they formed a semi-circle looking down at us. In front of the 13-stone platform was a fenced area with scattered burnt sticks lying as if for the picking. I realized I was looking at a cremation ground. I also realized in shock that this must have been the place where the tribals killed in police firing were consecrated to fire and that the place has been left intact as a grim reminder. Waiting as if for some relief or resolution.

We were in the village of Gobarghati, where the Kalinganagar firing happened. A village a few hours' drive from Bhubaneswar. A typical tribal village, thatched huts, surrounded by bamboo groves placed in the midst of paddy fields. But behind the hush we could feel the tension. Two years ago, protests against the takeover of village land for the Tata steel plant had led to an armed skirmish. The village is part of an industrial estate for which the state government had acquired land some years ago. In 2006, when the company started building its boundary wall the fight broke out. After the firing, villagers blockaded the national highway for well over a year. It was lifted when the chief minister finally met the village representatives and gave some 'assurances'. But nothing has changed on the ground.

The villagers we met were angry and resolute. They said they would not give up their land. When asked if they would agree if they were paid higher compensation, they simply said no. "We are poor, but our land gives us enough for us to survive. If we do not have this,

what will we do?" When we asked if they would agree if the company provided jobs, their answer was equally straightforward. "We have seen the factories that have come up around us, we have seen that they had promised our people jobs when they took away our land. But our people have no jobs and no land. The factories say they cannot employ us because we are not educated, they say they do not need so many people. Why should we believe them now?"

We were left with questions. We had no answers.

We then visited the rehabilitation colony set up to relocate villagers whose land had been acquired. Company officials said they were planning to give employment to a nominated family member. This would need skill development or education. They were beginning to train villagers in welding and other trades. In addition, the government had also agreed to raise cash compensation from Rs 14,000 per hectare (ha) to Rs 40,000 per ha; a 400 sq-m plot and Rs 1.5 lakh as aid to build a house. Within the family each adult son would be considered separate, which would mean benefits would multiply. A good deal is how company officials saw it.

We asked young men in the colony, why they had moved. "Because we had no land and we were given jobs." But they also said, with obvious pain in their eyes, that since then they could not enter their village. They had been ostracized. Clearly, there was anger and however good the deal, there was resistance.

The question was why? Was it just the cussedness of few individuals; or the vested interests of competitors fuelling the unrest; or were the simple villagers we met Naxalites fighting an ideological war against the state and industry? The why question was even more incomprehensible if you thought that the people fighting change were poor—they lived in mud and thatched huts, which would be exchanged for brick houses; they were subject to the vagaries of rainfall, and crop failure, which they would give up for cash compensation. The agricultural fields for us, from the outside, certainly looked impoverished. In our eyes, the future looked only brighter.

But this is where we must understand differently. In Gobarghati, I could not see Naxalites or misguided people. All I could see were people fighting for all they have in full knowledge that their poverty is only going to be exchanged for greater deprivation and marginalization. They know they do not have the skills to succeed in the new world. They also know, after bitter experience, that the industrial world does not need many people to work its enterprises. It needs their land, water, minerals, but not their labour. Even if they get the promised homes, compensation for land, they won't have work. Their land is marginal, they are poor but they survive.

Not far away, villagers who face displacement by the Korean giant Posco's steel plant have also set new terms. They want higher compensation for agricultural and homestead land; employment for every adult in this and future generations; houses and amenities; Rs 1,000 as monthly allowance for people too old to get a job and a share of profits. This, we must understand, is not greed, but the value the poor put to their land. We must also understand that modern industry cannot compete with agriculture in terms of livelihood security.

If we accept this maybe we will look for answers differently. It is clear that industry will need land, the question is at what cost and how much. Industry is greedy for land. Tata will get 1,000 ha for their steel plant. Their neighbour, Neelanchal Steel, has got a slice, too, where it has planted trees—a 'green' steel mill built on poor people's land.

The question is why Indian industry cannot be far more frugal in its demand for land as indeed it must be with its need for water? Why should industry not negotiate and pay the price people want for their land. In this case, it will also look for less valuable, less cultivable land. Most importantly how can market-believers justify the use of the land acquisition act, which allows government to takeover any land, without questions asked, for so-called public purpose. This is cheap and dirty industrialization. It will not work. ■

—Sunita Narain

Long live socialism. Socialism is almost dead



Inside the preamble, and outside it

THE Goa chief minister's unwillingness to allow special economic zones (SEZs) in his state must have mildly zapped his central colleagues (see p 24). Has he become a socialist? Doesn't he aspire for his state? But what Digambar Kamat did was to please his electorate; his energy has deflated the commerce ministry and it seems Goa SEZs are going to be denotified. We must ask: so it is easy to get rid of the idea of SEZ, right? There are anti-SEZ protests in every state, against special treatment to industrialists whose interests amount to creating private states within the union of India, propelled primarily by farmers. Outbursts usually dealt with violent forces, gunshots. How come the Goa CM responded positively?

Protesters in Goa speak in English, and have a large middle class component of those who have seen their land ravaged by mining and property developers. Opposition in other states is 'vernacular', led by poor farmers the state and a section of media can volubly dismiss as an inarticulate lot. They don't understand growth, is the buzz. (Please note rich farmers are protected; the survey post never springs up on their land.)

All chief ministers are intelligent enough to realize that providing free electricity and water at a discount to industries that will generate very little local employment will not bring much prosperity to their state. But the game goes on. Trashing subsidy to agriculture is a shame. For all efforts are to prove agriculture unviable, and hand over precious natural resource to private developers.

Fortunately, the great Indian social set-up is not unidirectional (see p 28-34). Hiware Bazar has proved the rural economy can be so profitable that it brings all villagers, who had earlier fled to cities, back. They have done this by simply using a state-run programme, the Employment Guarantee Scheme (EGS), a small amount, creatively, just conserving soil and water. The small EGS money is good enough to turn one-fourth of the village into millionnaires. They reckon the dignity of prosperity lies in collectively creating and then harvesting bountiful capital, a model the exact opposite of giving away precious natural resources to private profiteers at a devalued rate.

It is not surprising that the centre, in response to a supreme court question, has validated 'socialism' in the constitution (p 11). Outside the preamble, official policies irrespective of political hue prove otherwise. It is absurd that the rhetoric of socialism has become good ad copy for the state. ■

Tiger balm



Assuages wildlife lobby, burns forest dwellers

IN THE 'Tribal Vs Tiger' wrestling match, the first round has gone to the tiger. May its tribe increase. Activists lobbying for tribal and non-tribal forest dwellers rights had agreed that inviolate space in forest for wildlife would be mapped scientifically before the act was to be notified. This was a demand that had been made by the wildlife lobby, rightly led by the top predator, the tiger lobby. They feared the implementation of the forest rights act before marking essential wildlife territory might help forest dwellers settle in wildlife space, armed with rights. Introduction of 'critical wildlife habitat', a new wildlife term, and the anticipation of a long process to identify it probably made forest rights activists think it wouldn't get done. But there was political compulsion. So, a 'critical tiger habitat' was notified fast, in place of 'critical wildlife habitat'.

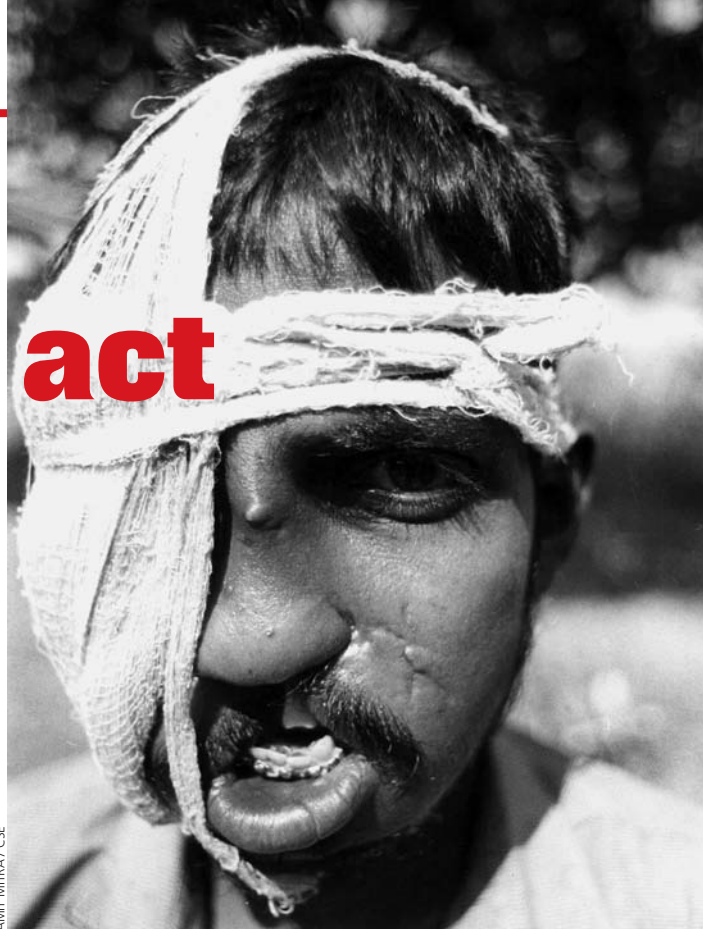
Critical tiger habitats, as notified by the government, has virtually made it impossible for any forest dweller to stay in a tiger reserve. It was originally envisaged that a part of the core area in tiger reserves would be claimed as inviolate space. Though the core area in tiger reserves is around 17,000 sq km, foresters have come up with an area of more than 30,000 sq km as critical tiger habitat, which is almost equal to the total tiger habitat in India. Tribal rights activists may criticize the manner in which this habitat has been marked, but it doesn't really matter anymore. The critical habitat has legal sanction. What they have to realize is that this is just the opening of the door—to be followed by critical habitats for a host of other animals.

This result defeats the very purpose of the act: to provide tribals legal recognition of customary rights. That is why the original draft suggested that tribals be given provisional rights in the core area of protected area for five years and be relocated within that period. The new scenario has made forest dwellers vulnerable and subject to the usual process of relocation without a piece of paper to prove customary ownership.

This episode underlines the character of our polity, trapped in binary mode. One that rides roughshod over multivalence and nuance. It speaks of a society that does not engage in critical dialogue, in which institutions have failed and academia is passive. 'Politicking' is a national pastime and decisions are arrived through school debating skills. Tribals have lost. Let's hope tigers multiply with their new roaming facility. ■

Appeasing **act**

Government tries to please both tiger and tribal lobbies, complicates matter



Forest dweller in Rajaji National Park, mauled by a tiger

KIRTIMAN AWASTHI

ON JANUARY 1, 2008, the government after much vacillation notified the rules of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act. The day before, it had notified “critical tiger habitats” in 28 existing and eight proposed tiger reserves. It scored on both tiger conservation and protection of tribal rights. A closer look at the notifications reveals that much has slipped between the drafts and the final legislation.

The forest rights act has also come in conflict with the supreme court’s Central Empowerment Committee’s recommendations on regularization of settlements in forest (see box: *Court vs forest rights act*).

The forest rights act has introduced a new category, the “critical wildlife habitats” within sanctuaries to be kept free of human habitation. This was to ensure that the rights of tribal people and other traditional forest dwellers would not be affected unless it was decided after scientific study that the area had to be kept inviolate for wildlife, in which case they would be relocated. The bill introduced in the Lok Sabha in December 2005 had a different formulation for this conflict between tribal land

settlement and wildlife conservation. It said that tribal people who lived in the core areas of sanctuaries and national parks would be given provisional rights for five years. If they were not relocated within this period, the rights would be made permanent. The term ‘critical wildlife habitat’ was included in the bill in the Rajya Sabha in 2006. This has complicated matters.

The wildlife lobby has argued that unless the critical habitats are notified government must not notify the forest rights bill. Its interpretation was that if this was not done then land settlement would take place in all wildlife areas. The complication is that till date there was no provision for declaring an area critical. The Wildlife (Protection) Act, 1972, legislates for the creation of sanctuaries and national parks with different degrees of protection. Even the terms core area and buffer areas, which have been used commonly in the management of the protected reserves, have no legal basis. The 2006 wildlife amendment bill, also known as the tiger amendment bill, was also modified in Parliament to introduce the category critical tiger habitats. Not

surprisingly then, this inclusion has been used by the conservation lobby to press the government to bring almost entire area of tiger reserves under critical tiger habitats. In addition, eight proposed new tiger reserves have been added in the identified critical category.

The government claims that according to requirements of the act, an expert committee was formed and states asked to convene meetings and finalise the areas. As a result 31,940 sq km has been notified as critical tiger habitat, almost the entire area of existing tiger reserves. It also says that there are 273 villages inside the identified area that will need to be relocated. Curiously, the Tiger Task Force report commissioned by the prime minister in 2005 also identifies 273 villages inside the core areas of 28 tiger reserves, though it says that the area covered by the core is only 17,600 sq km. It estimates over 1,500 villages inside these reserves.

“The previously used core areas were mainly for administrative purposes. There was no scientific basis for them,” says Rajesh Gopal, member secretary, National Tiger Conservation Authority. “Critical tiger habitats

Critical tiger habitats close to total area of tiger reserves

have been identified based on the criterion that they can hold a minimum of 20 breeding females," he adds.

This has alarmed forest rights activists, who say creating inviolate areas could mean moving about a million people out of tiger reserves. "There is not a single block within Buxa Tiger Reserve that is not inhabited, and the forest department knows very well that people of the Sunderbans venture into the forests to collect forest produce," says Soumitro Ghosh, a West Bengal-based activist. "Why does not the government first settle the rights issue and then go for identification of critical habitats," asks R Sreedhar, coordinator, Academy for Mountain Environics, an NGO for community development. While the government says it has followed proper procedure, activists allege that the guidelines for identifying critical habitats do not follow the provisions in the act.

Activists got strength after media reports revealed that in late November the conservator of forests of the Kodagu Forest Circle in Karnataka had written to the principal chief conservator of forests and the chief wildlife warden to withdraw the directions issued to him to identify inviolate areas, terming the

A lobby is now demanding critical wildlife habitats

order illegal and unethical. "It seems the government has not taken the consent of *gram sabhas* concerned and settled people's rights in those areas," says Ashish Kothari, member, Kalpvriksh, Pune.

Government officials say that the government has only notified critical tiger habitats and the process of making them inviolate is yet to begin. It said the resettlement plan, providing an enhanced compensation of Rs 10 lakh, is ready and will be implemented after settling the rights of the people. "The issue is not whether there are villages inside critical tiger habitats. The issue is whether their rights are recognised and procedures for resettlement followed as laid down by the act. This will start soon," says Gopal.

But it seems the battle is not over. On the one hand, conservationists are demanding identification of inviolate areas for other wildlife, from gharials to elephants. On the other hand, tribal groups are up in arms alleging that the government has not followed its procedure in identification of the critical areas. They also claim that the government has diluted the act (see box: *Forest rights diluted*).

Is it a case of trying to please everyone and pleasing none? ■

Forest rights diluted

Activists welcome the notification of the forest rights act, but say it has been diluted. Forest dwellers will require documentary evidence to claim rights, which most do not have, says Shankar Gopalakrishnan, activist with the Campaign for Survival and Dignity, a federation of tribal and forest dwellers' organizations. "Also, the rules do not specify distinct roles of forest departments and communities. Overlapping will lead to conflict," says Ashish Kothari of Kalpvriksh. Comparison of the notified and draft rules makes the glitches clear.

- Rule 2(b) provides self-cultivation and "production or sale of produce" referring "only" to agricultural produce, not minor forest produce. "This may deny rights to sell minor forest produce," says Gopalakrishnan. The draft Rule 2(2) covered produce from forestland or forest-based uses, and stones and fuel wood.

- Rule 3(1) recognises the *gram sabha* only within the panchayat system. This contradicts both the forest rights act and the draft rules. The act's Section 2(p) states that the *gram sabha* could be panchayat, forest village, un-surveyed village or a traditional village. Rule 3(2) of the draft defined *gram sabha* of villages of all kinds.

- The rules provide no procedure for conversion of forest villages and unrecorded settlements into revenue villages for exercising the right to rehabilitation after forced displacement. Rule 18 of the draft laid down a conversion procedure.

- Rule 6(a) refers to the communities' "duties" under Section 5 of the act but ignores their role in conservation of forests and wildlife, although Section 5 of the act empowers the forest-rights holders to protect wildlife, biodiversity and forest. Rule 24 in the draft rules provided participation of forest rights holders in the preparation of management plan for conservation.

- Act provides for establishing scientific basis for identifying "critical wildlife habitat" for conservation. The current rules, however, make no mention of this provision.

Court vs forest rights act

The forest rights act was delivered a near-death blow in the supreme court on January 8, 2008. The court was hearing the Orissa government's plea for regularization of tribal settlement on forestland. But this petition was based on the 1990 Ministry of Environment and Forests' (MoEF's) notification reviewed and amended by the Central Empowered Committee (CEC). This notification provides for regularization of pre-October 1980 'encroachments'. Advocate Rajeev Dhavan said the Orissa issue could no longer be decided on this basis. "The 1990-MoEF circular and the subsequent circular of 2002 have become infructuous with the notification of act, which has laid down conditions for land settlement in forest,"

said Dhavan. He also pointed out that the court could not accept that protection given to tribals would be less in Orissa than in other states, which would follow the act. For instance, CEC recommended that regularization can be done simultaneously with eviction, implying post-1980 settlement will not be regularized. The act says the cut-off date for recognising forest rights will be December 2005, provided by then the claimant has three generations (each 25 years) residing on the land. When contacted CEC members feigned ignorance.

The court refused to stay the petition. This would mean, in legal terms, the supreme court has sanctified a parallel and weaker process of land settlement.

CONSTITUTIONAL LAW / INDIA

Sovereign, secular...and yes, socialist

The Supreme Court of India on January 8, 2008, refused to accede to a PIL plea seeking deletion of the word 'socialist' from the 'Preamble' to the constitution. The court said that the word 'socialism' means "welfare measures for the citizens" and should not be interpreted in a narrow sense defined by communists.

The court, however, agreed to hear the public-interest petition that had also sought to strike down another provision (section 29 A) of the Representation of People Act, 1951, requiring political parties to adhere to socialism for being recognized. After hearing the contention of the petitioner, Good Governance India Foundation (GGIF), a Kolkata-based NGO, the court has issued notices to the centre as well as the election commission to look into the issue of derecognizing political parties that do not adhere to socialism. The word 'socialist' was added through the 42nd amendment to the constitution. The petition had challenged the validity of the amendment saying the insertion has ascribed a political ideology to the word. The amendment came about during the

emergency and was a direct assault on the civil liberty, says Sanjiv Agarwal of GGIF. "While most of the deleterious amendments were reversed during the 44th amendment in 1978 and by later judgments, the word 'socialist' was left as it is," he said. It came in handy on occasions when democracy was abused, says Agarwal. The 44th amendment, which deleted the right to property from the list of fundamental rights made it easy for the government to acquire land for private players in the garb of public use, he says.

Experts like Arun Kumar, professor of economics, Jawaharlal Nehru University in Delhi, however, say democracy and socialism can coexist, depending on the will of the government. Congress spokesperson in the Rajya Sabha Abhishek Manu Singhvi also calls 'socialism' a desirable paradigm, essential for allround economic development of the country.

The PIL comes at a time when the Left parties are unsure of the socialist



agenda. Veteran CPI (M) leader told the media on January 3, 2008 that socialism is not achievable at this point..private capital has to be used while social welfare programmes by state governments must continue. CPI (M) however retracted the statement the next day saying Basu was misquoted. Nilotpal Basu, a senior CPI (M) member said, "Amending the constitution is the parliament's prerogative. Court can't decide on that." ■

FUNGAL STRIKE ON PALAEO-LITHIC ART

These 17,000-year-old cave paintings of bison, wild cattle, deer and other animals are facing a fungal attack for the second time in seven years. Nicknamed Sistine Chapel of pre-history, the caverns are at Lascaux in southwestern France. Scientists are treating the cave walls with a fungicide to check the spread of grey and black mould. Some blame the introduction of an air conditioning system in the cavern for the fungal invasions, while others believe that climate change is responsible for the outbreaks.



>> More than 100,000 tonnes of rotting garbage are lying on the roadsides of the southern Italian city of Naples, after garbage trucks stopped operating since the last week of December 2007 because all landfills are full. Authorities fear the stinking heaps could spread disease.

>> Bolivia, Chile and Brazil have agreed to facilitate a Pacific to Atlantic corridor by 2009.

>> Mexico's wage commission has raised the country's daily minimum wage by 4 per cent from January 1, 2008, just above the annual inflation rate. The minimum urban wage is now 52.59 pesos (US \$4.85) a day.

>> The Australian state New South Wales has announced that it will ban tobacco products containing fruit-flavoured additives.

>> Floods caused by torrential monsoon rains and landslides have displaced about 250,000 people in some districts of the eastern, northern and northcentral parts of Sri Lanka, according to the government estimates.

>> Ten districts in Afghanistan's Badakhshan Province are in need of immediate food assistance after heavy snowfall blocked roads to the province. About 200,000 people live in the affected region.

>> Chile has approved a law to preserve the country's forests, promote their sustainable use and foster related scientific research. Under the law, the government will provide US \$8 million a year as incentives for 30 years to small landowners and business groups for sustainable forest management.

FORESTRY / BRAZIL

Anti-deforestation law imposed

Following a recent announcement at the UN climate meeting in Bali, the Brazilian government has approved a bill that aims to monitor and prevent deforestation in the Amazon rainforests.

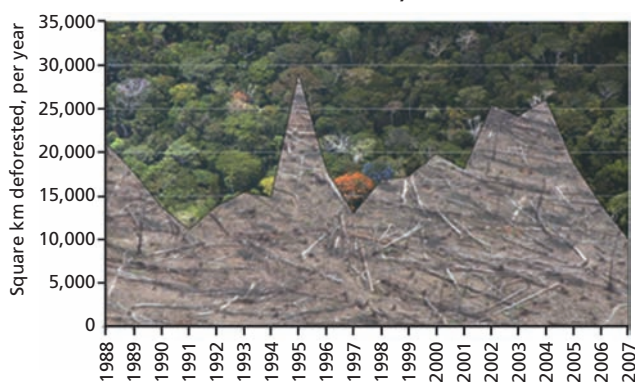
The measure requires property owners to re-register their holdings in the Amazon, failing which they will not

be eligible for government loans. According to the environment minister, Marina Silva, the re-registering process will be carried out initially in 32 municipalities which were responsible for 45 per cent of deforestation in 2006. "The process will help create a database to identify areas that require action against deforestation," said Silva. About 700 federal police will soon be deployed in the areas to aid 1,700 environmental

protection agents who are fighting illegal deforestation. The directive also bans the sale of livestock and agricultural produce grown in illegally deforested areas.

Citing a report, the government says the deforestation rate in the Amazon dropped by 20 per cent between August 2006 and July 2007. ■

Deforestation in the Brazilian Amazon, 1988-2007



CLIMATE CHANGE / EU

Aviation emissions to be traded

Starting 2012, greenhouse gases from civil aviation will be included in the EU emissions trading scheme, according to a recent agreement by the European Environment Council.

The agreement includes all flights between EU countries and those departing or landing in an EU country. The council proposed a cap at the 100 per

cent of the average level for 2004-2006. Environmental groups, however, criticized the plan saying that the EU is backing down from its tough stance. Earlier, the European Parliament had asked airlines to take part in the scheme from 2011. But now the council has postponed it to 2012. "While the emissions from the aviation industry is growing by four to five per cent a year, the move will give the sector more time to pollute," said Delia Villagrasa of WWF Europe. ■

FOOD / CHINA

Tax on grain exports

China has levied taxes on exports of food grains such as wheat, corn, rice and soybean from January 1, 2008. The move is apparently aimed at reining in surging domestic food prices, which have driven up inflation. Food prices rose by 18.2 per cent in November 2007, an 11-year high.

The export tax rates will range from 5-25 per cent and be levied on 57 categories of grain and grain products. The measure will discourage grain exports and help limit domestic grain prices, say researchers from the Institute of Market Economy, Development Research

Center of China's cabinet—a State Council think tank.

The decision comes just a week after China scrapped a 13 per cent export tax rebate on 84 categories of grains and grain products. Those rebates, together with high international grain prices, boosted Chinese grain exports in 2007.

The export taxes, will remain in force until the end of 2008 and will mostly affect South Korea and Japan, who may now resort to other suppliers including the US, Brazil and

CLIMATE CHANGE / USA

16 states sue federal govt

California and 15 other US states have sued the federal government after the US Environmental Protection Agency (EPA) rejected the state's effort to curb greenhouse gases from cars and trucks. The lawsuit, filed in the US 9th Circuit Court of Appeals marks a new round in the five-year struggle between California and the federal government over whether states have the power to regulate CO₂ and other pollutants.

Under the federal Clean Air Act, California can enact stricter air pollution laws than the federal government as long as it gets a waiver from the EPA. On December 19, however, EPA denied a waiver for the state's landmark 2002 law, which seeks to cut greenhouse gas emissions from new vehicles by 30 per cent over the next eight years. EPA said that the new energy law will help raise fuel economy standards to an average of 35 miles per gallon (mpg) by 2020, which is a more effective approach to reducing greenhouse gases than a patchwork of state regulations. California says its more aggressive law would require the auto industry to cut emissions by one-third by 2016, boosting efficiency to 36.8 mpg. The other states who have joined in the lawsuit have adopted California's emissions standards.

Argentina. Economists expect the inflation to ease as new crops start coming to the market. ■

Grain export duty will secure domestic food supply

NATURAL DISASTER / INDONESIA

Mud breaches dams

Just a few days after an Indonesian court rejected a lawsuit brought by environmental groups against an energy company alleged to have caused mud volcano in Sidoarjo district, hot and black sludge from the volcano started flowing again.

Heavy monsoon rains have exacerbated the mud flow causing dams surrounding the disaster-zone to breach on January 3. Residents in Porong in East Java province fled from homes after the mudflow covered the nearby railway tracks and roads. The mud volcano first erupted on May 29, 2006,



All attempts to stem the tide of mud have failed

and has since displaced over 15,000 people. Scientists blame the energy company, Lapindo Brantas, for causing the rupture by improper drilling at a gas reserve site.

Meanwhile, as heavy rains continue, landslides and floods across the Java island left about 130 people dead or missing over the last week of December. ■

MINING / SIERRA LEONE

Diamond mining suspended

The Sierra Leone government has called for an inquiry into the unrest over diamond-mining operations in the eastern district of Kono, where residents were killed during protests in the second

Koidu Holdings' diamond mining site



week of December, 2007. The government has asked the mining company, Koidu Holdings, to suspend its operations in Kono's Koidu town until the inquiry is over. A 10 p.m.-to-6 a.m. curfew has been imposed in the area.

Irate residents of Koidu say the company's mining operations in the area has affected their lives. Besides, the company has reneged on agreements to compensate the project-affected people and provide better living conditions to displaced families, they say. Earlier in November, they sent a resolution to Koidu Holdings and the government, posing an 'ultimatum' of one month to address their grievances. Residents now demand the government renegotiate the company's lease terms. Though rich in diamonds, Kono lacks piped water, electricity and good roads. ■

WHALING / JAPAN-AUSTRALIA

Humpbacks given a respite

Following intense pressure from the International Whaling Commission (IWC), Japan has dropped plans to hunt humpback whales during this year's annual whaling expedition, which is underway in the Antarctic Ocean.

In November 2007, Japan despatched its whaling fleet to the Antarctic in the first major hunt of humpback whales since the 1960s. In addition to minke and fin whales, the fleet intended to kill 50 humpbacks. The

plan came under quick criticism from environmental groups, which oppose the hunts to begin with but were outraged by the inclusion of humpbacks. Classified as vulnerable by the World Conservation Union (IUCN), IWC banned the commercial hunting of humpback whales in 1966.

Japan says it will not hunt humpbacks until the next annual meeting of IWC in June 2008. Environmentalists have welcomed the climb down, but say Japan still flouts the international opinion by going after minke and fin whales under the guise of scientific whaling. ■

BIRD FLU HITS BANGLADESH:

Nearly 2,000 chickens have been culled in a village in northern Bangladesh after the H5N1 bird flu virus was detected at a poultry farm in the last week of December. This latest spurt of infection was in Dinajpur district, near the capital city Dhaka. The government says the bird flu has spread mainly to northern districts since it was first detected in March 2007. Till now authorities have culled about 275,000 chickens and destroyed nearly 3 million eggs. About 4 million people in Bangladesh are associated with poultry farming.



ANIMAL WELFARE BILL:

Sri Lanka gazetted an Animal Welfare Bill, which aims for the state to accept greater responsibility for the welfare of animals and to protect them from cruelty. Animal welfare lobbies have long waited for the bill that will eventually replace the Prevention of Cruelty to Animals Ordinance enacted by the British rulers in 1907, which did not impose adequate penalties for animal cruelty. The gazetted bill also recommends establishing a National Animal Welfare Authority with wide powers to deal with matters relating to animal welfare.

WILDLIFE / CALIFORNIA-AUSTRALIA

Kangaroo products kick in

The US state California has lifted a three-decade-old ban on the sale of goods made from kangaroo leather.

World's leading sportswear companies use kangaroo hide to make soccer shoes and other sports footwear, which are popular among athletes. In 1971, following opposition from animal rights groups, California banned the sale of products made from the hide of kangaroos and other animals threatened with extinction. In 1995, the Australian government said that the kangaroo populations recovered, following which, the Californian State Legislature introduced a bill in 2003 to repeal the ban. But the bill was pending for nearly five years. The new law legalizes the import of products harvested from non-endangered kangaroo species only. ■

CLIMATE CHANGE / GERMANY

No dirty cars in city centres

Three German cities—the capital Berlin, Cologne, and Hanover—introduced a new air pollution curbing system on January 1, which bans the dirtiest vehicles in their city centres.

A car badge system requires vehicles to carry a coloured badge—red, yellow or green—certifying their level of exhaust emissions. Drivers need to display these badges before entering the inner city zones, failing which they could be fined 40 euros (US \$58.80) and a penalty point on their licences. The system applies to all vehicles, including those registered outside Germany and will be expanded to other German cities in the course of the year. Berlin's environment senator, Katrin Lompscher,

says only vehicles with extremely high emissions of noxious substances will be banned under the system. The German Motoring Club, ADAC, is not happy with the restriction. About 1.7 million older diesel vehicles are too polluting to qualify for a badge and will be barred from entering city centres, it says. ADAC plans to file a lawsuit against the system. ■

New badges for less-polluting vehicles

BIOFUEL / USA

Florida gives ethanol a leg up

The US state Florida has come up with draft motor fuel rules that aims to boost ethanol blending in the country's third largest petrol market.

Limited ethanol blending is already occurring in Florida. But following the approval of the Energy Independence and Security Act, 2007, the draft rules will help the government of Florida create a much needed regulatory framework to open up its market to the burgeoning US ethanol industry. Earlier, ethanol companies in Florida had urged the government to relax state rules that discourage refiners from adding ethanol to petrol sold in the region.

At least four other states in the US are also considering new petrol rules that could open markets to biofuels. ■

Turning waste to energy

ENERGY / PERU

Loan approved despite protests

Amidst oppositions from environmental groups, the Inter-American Development Bank has approved a US \$400-million loan for the construction of a liquefied natural gas (LNG) project in Peru. The project will be the country's first LNG export facility.

Camisea field is an important gas reserve in South America that Peru wants to develop as part of a broader plan to gain energy self-sufficiency. Environmental groups oppose the project, because it is located in the Amazon rainforests, which is inhabited by indigenous people. Besides, its main pipelines traverse through the steep Andes mountains and other national parks. Since March 2006, there have been five spills along the pipelines. ■

MINING / VIETNAM

Open economic zone ransacked

Hundreds of Vietnamese villagers ransacked a proposed titanium mining site on December 28, which they fear will pollute the soil and the ground water.

Over 300 protesters destroyed machinery and pipelines at the site near the seaside of Tam Tien commune in central province of Quang Nam, say local media reports.

IBM SUED OVER POLLUTION:

Residents and business groups in New York sued IBM Corporation on January 3 alleging that decades of pollution from the company's former microelectronics plant in the village of Endicott, Broome county, has made them sick. The lawsuit says IBM, which built computers, circuit boards, integrated circuits and related goods at the Endicott plant from 1924 to 2002, failed to protect residents from toxic chemical pollutants like trichloroethylene, tetrachloroethylene, trichloroethane, benzene and trichlorotrifluoroethane. Decades of exposure to these industrial wastes are causing higher rates of cancers and heart defects in the area, says the lawsuit. IBM says under a cleanup required by state regulators, it has built hundreds of extraction and investigation wells since 1979 to monitor groundwater pollution in the area and has already addressed the residents' concerns.



HOUSING ROW: An environment court in New Zealand has confirmed policies that will help protect Marlborough district's productive

soils and make it tougher to develop housing and business complexes in rural areas. The court has asked the district council to modify a plan proposed by wine industries several years ago that would have allowed fragmentation of rural areas through inappropriate development of housing and business complexes.

The residents became outraged after they learned that the company, Chu Lai Open Economic Zone, had cut down a 15-hectare stretch of forest that had protected the villages from sand and storms. Chu Lai plans to first mine the area for titanium—a metal used in the light alloy for aircrafts and automobiles—and to later build a tourist resort there.

The Vietnamese government is aggressively promoting open economic zones to attract foreign investment. ■

Ready to give up land for POSCO

Villagers in Orissa want 5 per cent of the company's profits

RAVLEEN KAUR

SOME people in Orissa's Jagatsinghpur district, in a complete turnaround from their earlier stand, agreed to give up land for the POSCO steel plant on January 5, but with conditions. They have asked for a 5 per cent share in the profits of the company, among other demands.

In another development, the Central Empowered Committee, which advises the supreme court on forest-related cases, recommended that mines, steel plant and captive port—POSCO's proposed projects—should be considered as one and reviewed in entirety for its ecological significance and rehabilitation plans rather than as three different projects. POSCO filed an affidavit in the apex court on January 4, contesting the recommendations and asking for separate clearances for its three "separate" projects. The case will come up for hearing in the third week of January.

While POSCO officials haven't agreed to the people's demands of sharing the company's profits yet, the Orissa government is planning to set up a high-level committee to discuss them. The villagers also want Rs 25 lakh per acre for their agricultural land and Rs 40 lakh per acre for their homestead land. Other demands include job guarantee, Rs 1,000-monthly allowance to people above 60 and Rs 3,000 per month for families who do not have members eligible for jobs, including the landless



POSCO turnaround: For the time being, villagers want their demands met first

who were employed as daily wagers in the betel farms.

The demands were finalized in a meeting organized by Damodar Rout, a local MLA. "The 52-member committee I formed has made the demand. The state government will take a final decision after the demarcation survey is done. However, it appears unlikely that the company will share its profits with people," Rout said.

When officials went for the survey, the villagers did not allow them to do it. They said their demands must be fulfilled first. The survey has been put off for an indefinite period.

Under duress

Activists from Orissa Bachao Andolan (OBA), a protesting organization, say the demands have been made by "so-called POSCO supporters" only, mostly in the Nuagaon panchayat. "The talk of 5 per cent share in profits is a rumour. Some people had earlier demanded Rs 14 lakh per acre for their agricultural land and a two-room house with all amenities. But POSCO officers rejected the demands saying they were exorbitant. The officers told them to come up with a charter of demands, which they have now," says Nikunj Bhutia of OBA.

People of three panchayats—Dhinkia, Nuagaon and Gandhakujanga—have been protesting against land acquisition for the steel plant and a captive port for POSCO since July 2005. Activists also say people gave in to POSCO because of the threats and punishments they were being subjected to after the villages were cordoned in November last year (see 'POSCO war', *Down To Earth*, December 31, 2007). S P Mishra, public relations officer of the Orissa governor, says the imbroglio will be resolved soon. "A lot of time has been lost and constructions have to begin by April. So, the government may give in to the demands," he said. ■

LOSS OF HEARING

Officials did not inform the people

The public hearing for Jindal group's fourth coal mine in Tamnar block in Raigarh, Chhattisgarh, was conducted amidst protests on January 5. People claimed they were not informed of the hearing and they did not have the environmental impact assessment report or its executive summary—a violation of the Environment Impact Assessment Notification, 2006. The villagers said they were duped and they would not part with even a "single inch of land". Villagers allege Jindal supporters

created a ruckus at the meeting, and the police resorted to a lathi-charge injuring around 100 villagers. The presiding officer thereafter announced that the public hearing was cancelled but later resumed the meeting after two hours without the villagers being present.

Agitated villagers are currently protesting by blocking the road for coal dumpers and demanding the hearing should be declared cancelled, besides action against the police officer and the administration for the lathi-charge.

Packaging poisons baby food

Popular baby food brands incriminated

ARNAB PRATIM DUTTA

BABY food is contaminated with a chemical that could possibly lead to cancer or neurobehavioural disorders. Investigations by Environmental Working Group (EWG), a US-based public interest organization, revealed an infant food formulation is contaminated by a suspected endocrine disruptor called bisphenol A (BPA), which in studies have shown to cause cancer in animals.

BPA is a component of epoxy resin, which is used to coat the interiors of metal cans during packaging to prevent corrosion. The investigation revealed that BPA leached into the infant food formulations, raising concerns about exposure to toxic chemicals.

EWG made public its findings in December 2007. It incriminated manufacturers of some of the most popular baby food brands. Baby food sold by Nestlé, Ross-Abbot (Similac), Mead-Johnson (Enfamil), Hain-Celestial (Earth's Best), and PBM (sold under various names) were picked up for testing. The study said the average contamination of BPA was 5 parts per billion (ppb) while four samples contained BPA levels of 10 ppb.

Several studies have linked BPA with pathological problems ranging from carcinogenic activity to changes in reproductive organs and hyper activity. A Tufts University's School of Medicine's study in Boston reported dosage as low as 2.5 ppb could lead to uncharacteristic growth in cell patterns linked to breast cancer in mice models.

In India, little has been done to protect infants from the effects of toxic chemicals. India's infant food consumption was estimated at 363,000 tonnes in 2003-2004 with a growth rate of 6.8 per cent annually. India will need 538,000 tonnes of baby food in 2009-2010. Despite such targets there are no regulations in place. The Food Safety and Standards Act, 2006, is vague about tox-



icity from food packaging. "BPA is not covered in the act," a senior official of the Union Ministry of Health and Family Welfare said.

He said that the definition of unsafe food includes packaging which contains toxins and deleterious chemicals, but does not specify

what the chemicals are. BPA, however, is considered to be a hazardous substance under manufacture, storage and import of hazardous chemicals rules, 1989, says a senior official of the Union Ministry of Environment and Forests.

"There are special rules for transportation, storage, manufacturing and import of BPA. It is the health ministry's responsibility to ensure it does not leach into food products," he said. ■

Hanging gardens

Mumbai open spaces in limbo

NIDHI JAMWAL *Mumbai*

THERE is very little clarity and much wrangling between Municipal Corporation of Greater Mumbai and the Maharashtra government over Mumbai's open space policy. The state

government asked the corporation to put a stay on the policy. The local body in turn asked for a clarification on the stay order from the state government. The state government then asked the corporation for a report on Mumbai's open spaces but hasn't given the local body a strict timeframe for it.

Known as the RG/PG (recreation ground and play ground) policy, it has two sub-policies—caretaker policy and adoption policy. Under the adoption policy, the RG/PG is leased to trusts/NGOs for five years. Construction is not allowed, except for a 3 m/3 m watchman-chowky-cum-store room. Open spaces in the caretaker policy are leased to private organizations/corporate bodies for a minimum period of 33 years and construction is allowed on 25 per cent of the total open space.

"The policy was not being implemented the way it was intended. The corporation needs to submit a report, based on which the state government will take a decision," Ramanand Tiwari, additional chief secretary, Maharashtra, said. On being probed further about which part of the policy was put on hold, he said, "The issue is highly controversial and I would not like to comment." R A Rajeev, additional municipal commissioner of the corporation, was also unavailable for clarification.

The caretaker policy had received a lot of flak, which had led the corporation to discontinue it. Implementation of the policy, town planners felt, would lead to handing over Mumbai's reserved open public spaces to private organizations/corporate bodies for development and maintenance (see 'Mumbai may lose its open spaces', *Down To Earth*, November 30, 2006).

But for the past one year, the corpo-

Stay ordered



ration was working towards reintroducing the caretaker policy via an amendment. Despite protests, the corporation's improvement committee cleared the amendment in November 2007. But the state government put a stay on it and the corporation finally withdrew it in December. Citizen groups say a stay order on the policy is good news. "But we want it to be repealed," says Nayana Kathpalia, co-convenor, of Mumbai-based CitiSpace, a citizens' forum for protection of public spaces. ■

Lifestyle scan

Ministry now has a plan

THE Union Ministry of Health and Family Welfare recently launched a national programme on prevention and control of non-communicable diseases—diabetes, cardiovascular diseases and stroke—in the country.

Lifestyle-related diseases accounted for 53 per cent of all deaths in India in 2005. India had agreed to WHO's global strategy on diet, physical activity and health in 2004, but had failed to implement any major programme. The only other programme for non-communicable disease in the country is against cancer, which has existed for over 50 years.

The new pilot programme was launched in Kerala, Assam, Tamil Nadu, Punjab, Karnataka, Rajasthan and Andhra Pradesh. It will be implemented in one district in each state through a non-communicable disease cell. The Planning Commission has given the states Rs 49.16 lakh each to begin the programme.

Under the programme, the health of the general population will be promoted by increasing awareness at the community level, workplace and schools. People at high risk will be provided better treatment and care by reorienting the public health delivery system, setting up special clinics and involving private sector units such as the Indian Medical Association. It also involves assessing prevalence of risk factors in the community. This will involve getting information on tobacco and alcohol consumption habits, blood pressure, body mass index, etc. ■

Uranium mining cleared in Meghalaya

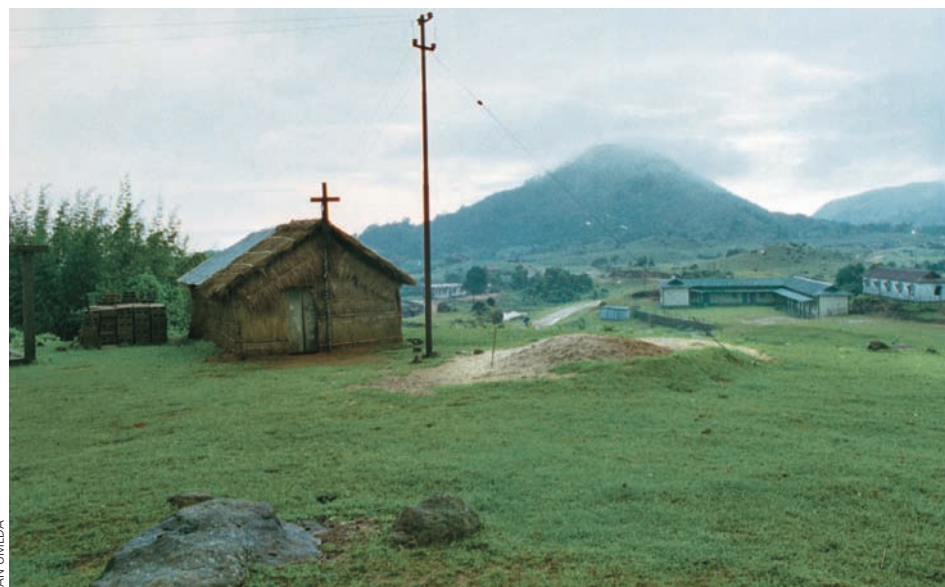
Residents surprised at the move; plan protests

MAUREEN NANDINI MITRA

THE Union Ministry of Environment and Forests (MOEF) cleared a controversial mining project by the Uranium Corporation of India Limited in Meghalaya last month, triggering fresh protests by local human rights and student groups in the state. The Rs 814 crore proposed Kylleng Pyndengso-

opposition on health and environmental grounds by civil rights organizations and political groups (see 'Divided we mine' *Down To Earth*, July 15, 2007).

"We had submitted our contentions to the ministry earlier and requested several clarifications about the project, but never received an answer, so this comes as a surprise to us," said Dino Dympep of the Human Rights Council.



Villagers in Meghalaya plan to appeal to the supreme court for a stay order

hiong opencast uranium mining and processing project at Mawthabab in the West Khasi Hills district requires 351 hectares and will impact over 75 villages within a 20-km radius of the project area. The population of these 78 villages, according to the 2001 census, is 26,108.

The ministry cleared the project saying the area was primarily wasteland and "no ecologically sensitive area such as national park, wildlife sanctuary, biosphere reserve or tiger reserve is reported to be located in the core and buffer zone of the mine". Local organizations, like the Khasi Students Union and the Meghalaya People's Human Rights Council, have "strongly objected" to MOEF's clearance and threatened "further agitations". In June 2007, a public hearing on the project was held amid a general strike in the state and fierce

"We don't know yet what form further protests will take, but right now we are considering appealing to the supreme court for a stay order, he said.

The MOEF go-ahead comes just before of the assembly elections in Meghalaya and chief minister D D Lapang has announced that the state government will seek the opinion of all political parties before making a decision on the project. The going won't be easy for the project given the unique land holding system in the Khasi Hills wherein all land is owned by either the local clan or individuals within the clan. Hence, all private and government deals will have to be ratified by these clans. Though the six villages where the project is scheduled to come up have agreed to give up their land, their assent is currently being contested at local courts. ■



End of the road

Bangalore gets JNNURM kick

RAVLEEN KAUR

BANGALORE Municipal Corporation's road projects have hit a dead end due to non-availability of funds. The corporation had applied for Rs 7,536 crore for flyovers and grade-separator projects under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM).

"Our city development plan had many road projects because the public expressed the need for them. We

haven't received the second instalment for a lot of projects and Rs 105 crore for developing 170 km of arterial and sub-arterial roads have still not been released. We haven't even got an official response," says J Manjunath of the Bruhat Bangalore Mahanagar Palike.

Officials in the Union Ministry of Urban Development say the ministry has decided not to clear any more road and transport projects under JNNURM unless cities submitted a comprehensive mobility plan. "There is no blanket ban but we have asked cities to submit a mobility plan. We did return some projects because cities did not have it," says S K Lohia, director in the ministry. The centre formulated a National Urban

Transport Policy in April 2006, which stressed that projects should be designed keeping in mind "the mobility of people rather than vehicles and should accordingly give priority to pedestrians, public transport and integrate land use and transport planning".

O P Mathur of the National Institute of Public Finance and Policy, New Delhi, says the government was focusing more on transport than roads. "Initially, they cleared a lot of projects but suddenly realized that a lot of money is going into flyovers. But this was not abrupt. They have given money for improving roads where cities have given convincing data for the need," he said. "We need to remember that the focus of JNNURM is reforms and not just infrastructure. If Bangalore corporation has not been issued funds, it may be because they have not been able to carry out certain reforms," he added.

The move has been criticized because of the centre's delayed response. "The government should have made it clear that no flyovers and road projects will be sanctioned unless cities kept in mind decongestion, peddlers and bullock carts. They cleared projects because they were in a hurry to allot funds," says Vinay Baindur of Collaborative for Advancement of Studies in Urbanism through Mix-Media. ■

Rs 43-crore subsidy for sugar mills

Corporates take active interest in bidding for sick mills

THE Bihar government on December 28, 2007 announced a Rs 43 crore subsidy for sugar mills in Bihar to help clear the Rs 90 crore arrear of the crushing season 2006-07 to cane growers. The rest of the dues, Rs 47 crore, will be cleared when the state receives interest-free loans against excise payments, declared earlier by the centre. The state cabinet has also reduced the zonal development commission payable by the mills to the state on the purchase of sugarcane. It has been reduced from 1.8 per cent to 0.45 per cent for the 2006-07 season.

Nitish Mishra, cane development minister, Bihar, said the nine functional mills, out of 28, will be given a cash subsidy of Rs 7 per quintal for the total sug-

arcane crushed in the last season and Rs 17 per quintal for late crushers.

The state government has leased out six sick units to HPCL, Reliance India Ltd, Rolcon Project and s s Infrastructure Ltd. Six other mills have been taken over by the Infrastructure Development Authority, a Bihar-government undertaking. Fresh bids will be invited for the three remaining mills.

The mills will be given out on a lease for 60 years, which can be extended for another 30 years. The government hopes to earn Rs 300 crore from the leases and pay off labour dues, voluntary retirement schemes and statutory liabilities of financial institutions, said Mishra. ■

AD AWARE

It's just not the consumption of tobacco, which is dangerous. Its marketing techniques, including advertisements, also have negative consequences. A recent survey of school children in Chennai and Delhi showed exposure to tobacco ads made children five times more susceptible to consuming it, and those receptive to marketing techniques were more than twice as likely to have used tobacco in any of its form. The survey found that 11-year olds had their favourite brands and among them are ITC's Wills cigarettes and Kothari Ltd's pan parag.

Researchers from University of Texas and NGOs, Health Related Information Dissemination Amongst Youth, Delhi, and Tamil Nadu Voluntary Health Association carried out the study. They measured the current and past use of tobacco of 11,748 students from 32 schools, and from different socio-economic groups. The survey also tried to evaluate if a child intended to use tobacco in future.

Iron in their soul

Inaction leads to protests

NIDHI JAMWAL

PROTEST is building up against Kundil Sponge Iron Ltd's unit in Londa town in Belgaum district, Karnataka. People are planning to take to the streets to protest against the rising pollution in the township, which has started affecting rice cultivation in neighbouring villages. They say although officials promised action against the plant, nothing has been done so far.

Aravind Jannu, the state secretary of Department of Ecology and Environment (DEE), had assured suitable action after inspecting the plant on December 1. "We didn't want the unit. It was thrust on us. Pollution levels are unimaginable and our houses are covered with soot. The secretary visited the plant but did not speak to local people. We will have to take drastic measures," says Shekhar Mithare, a resident of Londa (see 'Shifting pain', *Down To Earth*, March 31, 2006).

On October 30, 2007, Uday Kumar, DEE's regional director (environment), on a surprise visit to the plant, found

several violations. The report he prepared highlighted three things. One, the plant's electrostatic precipitator (ESP) was shut down leading to severe air pollution; two, the ore was being washed at the plant site and sludge was being thrown into the nearby stream; and three, openly stored by-products like dolomite caused pollution.

The report was forwarded to Jannu's office in Bangalore but nothing of consequence has happened. "I have not

received any communication from the secretary's office after his visit to the sponge iron unit... Kundil's plant is still in operation," Kumar said. Jannu was unavailable for comment.

Mithare says, "The Karnataka State Pollution Control Board officials intimate before they visit and authorities take care of pollution levels for that day." S Chiranjeev, spokesperson of Kundil, said his company was not making any official statement on the issue. ■

At last, standards for lead batteries

But they don't address recycling



Welcome proposition: Around 7,500 electric two wheelers were sold in 2006-07

US-BASED Occupational Knowledge (OK) International recently announced the launch of 'Better Environmental Sustainability Targets (BEST) certification' for lead battery manufacturers. Under the programme, lead battery manufacturing facilities that implement a collection programme and meet minimum emission standards for used batteries will be eligible for an eco-label.

The BEST certification standard was developed through a two-year multi-stakeholder process organized by OK International, Development Alternatives, New Delhi, and the National Referral Centre for Lead Poisoning in India, Bangalore. The step was taken keeping in mind public health and environment. Major battery manufacturers and automotive firms, including Hero Honda and Tata Motors, developed the standard along with representatives from the Indian govern-

ment. The first set of certification should come through in 2008.

Considering the growth of the battery industry for two wheelers and automobiles in India, the BEST standard was desperately required, says Rakesh Baweja, assistant general manager, Hero Honda. According to Society of Indian Automobile Manufacturers' domestic vehicles sales data, 7,341 electric two-wheelers were sold in 2006-07 in India, and several companies are coming up with more vehicles running on batteries. Electric two-wheelers mostly use lead acid batteries. Lead battery production is among the most significant source of lead exposures in the world. They can be a threat if not manufactured, used and disposed off safely.

Experts say the standard, however, does not address recycling, transport or other processes related to mining, primary smelting, or mineral processing. ■

Tobacco likes children

"Advertising and promotions make young people more susceptible to tobacco use by influencing their psychosocial risk factors and are strongly predictive of subsequent use," says Monika Arora, the lead author. Though India has a comprehensive legal framework to control advertising of tobacco products, the rules are rarely implemented. There has been a ban on advertising tobacco products since 2000 but tobacco companies continue to aggressively target the young. Arora suggests that ministers reviewing provisions of Indian Tobacco Control Act, 2006, must ensure strict and effective warnings are used on tobacco product packages to efficiently counter the messaging by the tobacco industry in India.

While the effect of advertisements on the prevalence of tobacco use has already been established in the West, this is the first time that such a study was carried out in India.

—VIBHA VARSHNEY

A welcome surprise

Indus river dolphin found in Punjab

THERE is considerable excitement in Harike wetland in Punjab over the sudden appearance of Indus river dolphins, an endangered species found only in Pakistan. "When I saw the hump and the snout, I knew they were Indus-river dolphins," says Basanta Kumar, divisional forest officer of Harike Wetland and Wildlife Sanctuary.

These dolphins have smaller snouts

and bigger heads than those found in the Ganga river. Around 1,100 dolphins are left in the Indus basin in Pakistan.

World Wildlife Fund (WWF) officials, after touring 35 km upstream of the Beas river, found five dolphin habitats. Kumar says the dolphins would have come during monsoons.

But WWF officials say it is unlikely because dolphins are found in deep pools, with clean water and a good current. Sandeep Behera of WWF says the dolphins in Harike could be resident population, not observed till now.

Punjab is contemplating conservation plans for the 34-hectare wetland. But Behera says the dolphins were seen outside the protected area where commercial fishing is carried out.

"That needs to be stopped along with a better conservation plan," he said. ■

'Big fishes' spotted turned out to be dolphins



REUTERS

Study finds Cauvery laced with toxins

Tamil Nadu minister does PR for polluter

CAUVERY river is heavily polluted. A recent study has found high levels of dioxins and furans in the drains joining the river. The study has implicated Chemplast Sanmar, a local company into polyvinyl chloride and chlorochemical production.

The study, conducted by Chennai-based Community Environmental Monitoring (CEM), an NGO, found the drains carry 6.7 nanogram/kg of toxins—eight times higher than the Canadian interim sediment quality standard of 0.85 nanogram/kg. The study said that there are 1,100 industries operating along the Cauvery, that discharge 162 million litres of effluents per day, and 87 million litres of effluents per day are discharged into the river.

The report was released on

November 12—two days after Tamil Nadu's Agriculture Minister Veerapandi Arumugam released a report highlighting Sanmar's commitment to the environment. Reinforcing the company's commitment to protecting the environment and explaining its green initiatives, N Sankar, chairman of the Sanmar group, said that the CEM report was "baseless, mischievous, imaginary and frivolous".

CEM undertook the study after farmers' complained of contamination of aquifers, farmlands, streams and the Cauvery itself because of the factory units operating along the river. The farmers wanted an independent study because they say that the Tamil Nadu State Pollution Control Board always "declared the discharges safe". ■

IN SHORT

► **BOVINE INTERVENTION:** The UK government is planning to cull badgers, the carriers of bovine tuberculosis (TB). Bovine TB is on the rise in the UK, causing 20,000 cattle to be slaughtered every year. But a 10-year old study of the government's independent scientific group, after a trial cutting of 10,000 badgers, says culling will not help reduce bovine TB. Ecologists say culling could lead to doubling of fox populations, the badgers' natural prey. This could lead to fewer poultry, the prey of foxes. They fear if there is an outbreak of rabies, it could spread quickly since foxes are its carriers.

► **POLLUTION CHECK:** China has announced it will conduct a census of its pollution sources by June 2008. The national pollution survey will factor in industrial, agricultural and residential pollution and remediation facilities in operation. But it has left out vehicular pollution. The data collected will be analyzed in the second half of 2008 and the survey findings will be examined and approved by June 2009. Currently, 26 per cent of the country's surface water is unusable, 62 per cent is unsuitable for fish and 90 per cent of the rivers running through cities are polluted.

► **WETLAND CONSERVATION:** The Union Ministry of Environment and Forests is set to come up with a draft regulatory framework for wetlands in India. The ministry has identified 94 wetlands for the draft. There is no legal framework exclusively for wetland conservation in the country. Conservationists have for long demanded the formulation of a regulatory regime for wetlands because they are fast disappearing falling prey to real estate development, East Kolkata Wetlands for instance, excessive water extraction and change in land use. Conservationists say it is important to take into consideration the socio-economic criteria for wetland identification under the framework.

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Polavaram wrangle

After legal challenge, report says project hydrologically not feasible

KIRTIMAN AWASTHI

The multi-crore Polavaram project in Andhra Pradesh is currently embroiled in legal issues. But now, the project is being contested on technical issues as well. A study carried out by the International Water Management Institute (IWMI), an international non-profit research and development organization, has questioned the fundamental basis on which the project was designed.

It was designed on the estimation that since the Godavari river has surplus water, it will be transferred to the water-deficit Krishna basin. The IWMI report has found that the Godavari does not have enough water to spare. A feasibility report by the National Water Develop-

ment Agency (NWDA) on the other hand says Godavari is water surplus. It calculated the surface water availability at Polavaram—the downstream-most dam on the Godavari (there are three dams)—to be 80,170 million cubic metres (mcm), considering 75 per cent assured flow (water available for 75 per cent of time in a year). NWDA officials calculated the figure using annual average rainfall data. IWMI calculated surface water availability to be 36,000 mcm using monthly data. After deducting all water allocations, as designed by NWDA, there is a deficit of 37,199 mcm (see table: *Godavari: Surplus or not?*).

“The problem with the annual average is it does not consider variability of flow within a year, which is very high in monsoon-driven rivers,” says Vladimir

Smakhtin, a hydrologist with IWMI, in his report. The catchment area gets around 70 per cent of rainfall just between June and September.

NWDA officials disagree. “Estimates based on annual average and monthly average will certainly vary. Since rainfall is not uniform throughout the year, it is better to take annual average. Our methodology is used for all inter-basin water transfer and is peer reviewed and approved by technical experts,” says N K Bhandari, chief engineer with NWDA.

Smakhtin says the NWDA method of calculation also overlooks the allocation of water to keep the river ecosystem alive. The water used for such purposes is called environmental water, which is an equally important component of use, besides other uses such as irrigation,



Map not to scale

Against the tide

The central idea behind the project was to transfer water from the Godavari river to the water-deficient Krishna basin. But a study claims the conception of Godavari having surplus water is a myth. And, among other things, the project, if given the go-ahead by the court, will submerge villages and displace several more

domestic and industrial projects. "The present planning of inter-basin water transfer is based on future irrigation requirement and ignores environmental water demand, which is important to maintain the ecology of the basin," says Parikshit Gautam, director, Freshwater and Wetland Conservation Programme, WWF-India. IWMI estimates that 8,200 mcm of water flow is required to keep the river fit for fisheries and wildlife. This itself is a conservative figure as this flow cannot make the river fit for human consumption by checking human and industrial waste.

Besides, says Smakhtin, "Even if the project continues, the water will be consumed en-route because of numerous uses. The objective of filling up Krishna basin will remain unfulfilled."

Ecologically not sound

Environmentalists say the Rs 12,000-crore Indira Sagar Multipurpose Project, or the Polavaram project, will impact the Godavari delta negatively. They say there is no study of the dam's impact on the delta and not taking into account the environmental use of water will result in the delta's stunted growth and lead to sea-side erosion and mangrove degradation. The IWMI report says the delta has regressed landward with a total net land loss of 1,836 hectares (ha) between 1976 and 2000, at the rate of 73.4 ha per year.

Some reports have also raised concerns on how a groundwater irrigated area will benefit from surface irrigation. Around 85 per cent of farmers depend

solely on groundwater for irrigation in the region. "If more than 85 per cent area is irrigated, there is no justification for the project. Besides, the per acre crop yield is always higher in the case of groundwater irrigation," says Himanshu Thakkar, coordinator of the South Asia Network on Dams, Rivers and People. But data shows that due to over-exploitation, groundwater in the region is fast depleting and surface irrigation can help.

The Polavaram dam is part of India's Rs 400,000-crore National River Linking Project, which was proposed as the solution to water-related problems in India. It envisages transferring waters from water surplus basins to water deficient basins.

The other problem, Smakhtin argues, is "there was no relevant and detailed hydrological data made available, despite efforts to obtain them". "The continued policy of hydrological data secrecy is not conducive to good water resources planning and development in India and will not lead to socially and environmentally acceptable water projects," he says.

IWMI report says Godavari is water deficient by 37,199 million cubic metres

Courtroom battles

The High Court of Andhra Pradesh will take up the Polavaram case on February 11. The National Environment Appellate Authority (NEAA) in December 2007 quashed environmental clearances to the project because public hearings, a mandatory proceeding, were not carried out in affected areas in Orissa and Chhattisgarh. It is estimated the project will displace around 200,000 people in Andhra Pradesh, Orissa and Chhattisgarh and submerge forests and parts of a wildlife sanctuary in Andhra Pradesh. The Andhra government had filed a petition in the high court and the court gave a suspension order against the NEAA ruling.

Activists, however, say there are more irregularities to the project. "There are two aspects—lack of public

Polavaram factfile

- Proposes to irrigate around 230,000 hectares in Vijaywada, West & East Godavari and Visakhapatnam districts
- Around 60,063 ha in Andhra Pradesh to get submerged, 2,398 ha in Chhattisgarh and 1,230 ha in Orissa
- Dam expected to divert around 5,325 million cubic metres of water (which is already questionable) to the Krishna delta through a 174-km Right Main Canal and to Visakhapatnam district through a 208-km Left Main Canal.
- Includes a 720-MW hydel power plant and irrigation facilities
- Around 250 villages from Andhra Pradesh, 13 from Chhattisgarh and 10 from Orissa will get submerged
- Project conceived in 1947-48; foundation laid in 1982; constructions in 2004
- Notice for public hearing in Andhra Pradesh, even before site clearance on September 10, 2005
- Site clearance on September 19, 2005
- Public hearing in Andhra Pradesh on October 10, 2005
- Environmental Impact Assessment submitted to Union Ministry of Environment and Forests (MoEF) on October 19, 2005
- Project given clearance by MoEF on October 25, 2005
- National Environment Appellate Authority quashes green clearance on December 19, 2007

Godavari: Surplus or not?

Environmental use of water left out

	NWDA	IWMI
Total surface water availability at dams	+80,170	+36,000
Effective availability for water transfer	+77,792	+33,622
Water allocation		
• Irrigation	-47,541	-47,541
• Domestic use	-1,890	-1,890
• Industrial use	-3,002	-3,002
• Hydropower	-6,380	-6,380
• Consumptive use	-3,808	-3,808
• Environmental use	—	-8,200
Total water requirement	-62,621	-70,821
Surface water balance	+15,171	-37,199

NWDA: National Water Development Authority;
IWMI: International Water Management Institute
All figures in million cubic metre

hearing and a faulty clearance process," says R Sreedhar of the Academy for Mountain Environics, Dehradun. He had filed a petition against the project's clearance in early 2006. The Union Ministry of Environment and Forests gave clearance to the project in October 2005. Environmentalist allege the project's environmental impact assessment report was prepared in 1985, which had estimated displacement of around 145,000 people from 250 villages, most of them being tribal villages (see box: *Polavaram factfile*).

"Since then population has increased considerably and the executive summary of the assessment on the number of villages and population is far from ground realities," says Ravi Pragada of the Mines, Minerals & People network. ■

SEZ scrap

Goa chief minister leads charge against central plans

R VENUGOPALAN NAIR *Goa*

On New Year's eve, Goa Chief Minister Digambar Kamat declared that his government had decided "to do away with" the special economic zones (SEZs) in their present form and had asked the centre to de-notify the approved SEZs. This is, however, easier said than done.

Disparate voices have emerged from the Union Commerce Ministry in regard to the proposal. Commerce Secretary G K Pillai, who also heads the Board of Approval for SEZs, said the state government did not have the power to scrap notified SEZs. Commerce Minister Kamal Nath contradicted him. After a meeting with the Goa chief minister on January 3, he said there were "absolute provisions" in the SEZ law for changes, including a review of notified SEZs. Rajeev Dhavan, senior supreme court advocate and a constitutional expert, believes that since the statute was framed by the centre only it can revoke it. However, he says that India's cooperative federalism system has enough space for resolving such disputes. No notification is irrevocable, he says.

The Congress has gone into overdrive to ensure that Kamat's rejection is not taken as the party's position on SEZs.

Congress spokesperson Abhishek Manu Singhvi told journalists that the party had no role to play in the Goa SEZs and that it was a decision of the state government and the commerce ministry.

The Kamat government announced scrapping SEZs after a panel set up to study their viability observed that "these tax-free havens were not right for Goa's development". The panel added that the proposed SEZs would not match Goa's talent pool, nor create employment, but would burden the state's infrastructure.

This was the opposite of what former chief minister Pratapsingh Rane had written to the Union commerce minister on December 21, 2006: SEZs would benefit Goa economically as well as help generate a lot of employment.

In 2006, the state government recommended 15 SEZs to the centre. Seven were approved. Formal notification has been issued for three SEZs: Meditab Specialties Pvt Ltd, Peninsula Pharma Research Centre Pvt Ltd and K Raheja Corporation Pvt Ltd. While Meditab got the permission to set up a pharma SEZ at Keri, Ponda, on 123 hectares (ha), Peninsula Pharma was to set up an R&D centre and a biotech park at Sancoale, Mormugao, on 20 ha. Raheja Corporation was to set up an IT SEZ at Verna Industrial Estate on 106 ha.

But what the government proposed, the people opposed. On the eve of Goa's Liberation day on December 18, 2007, Goa's Movement Against SEZ convenor Mathany Saldanha declared: "We demand immediate de-notification of all notified SEZs." People fear that SEZs will strain the infrastructure, especially water and power, besides leading to an influx of migrant workers. "SEZs will encourage real estate, leading to environmental degradation," says social activist Aires Rodrigues. The situation turned tense on December 23, when Saldanha told tourists to leave Goa by December 28 because the anti-SEZ agitation "could take an ugly turn".

Pressure builds up

Even as the administration tried to calm tempers, the chief minister met leaders of the anti-SEZ movement. The opposition BJP planned an agitation from January 1, while the Congress's partner in the government, the Nationalist Congress Party, declared it did not want any SEZ in Goa.

Goa's experiment with SEZs ran into further trouble when a task force appointed by the chief minister to look into the Regional Plan 2021 noted on December 23, 2007, that "SEZs are detrimental to Goa's interests". The Goa unit of the Congress forced the Kamat government to do a reality check. An SEZ study committee set up by the Congress's Goa unit in its interim report stated that SEZs in their present form were not in Goa's interests. Under attack from all quarters, the government recommended scrapping SEZs.

This has upset the Goa Chamber of Commerce and Industry (GCCI). "In the long run this will lead to industrialists avoiding Goa," said GCCI president Nitin Kunkoliekar. But will the three developers, who have invested crores of rupees in the SEZs, agree to shut shop? "The state government's recommendations apply only to projects that have not got permission. The SEZ policy has no clause to de-notify an SEZ that has been permitted," says Nitin Sardesai, counsel for Meditab Specialties, which has invested over Rs 200 crore in the project. Meditab Specialties has approached the Goa bench of the Bombay High Court, challenging the "verbal order" to stop construction. The controversy is not going to die soon. ■

Packing up or heading for somewhere else: Workers at an SEZ proposed for Keri



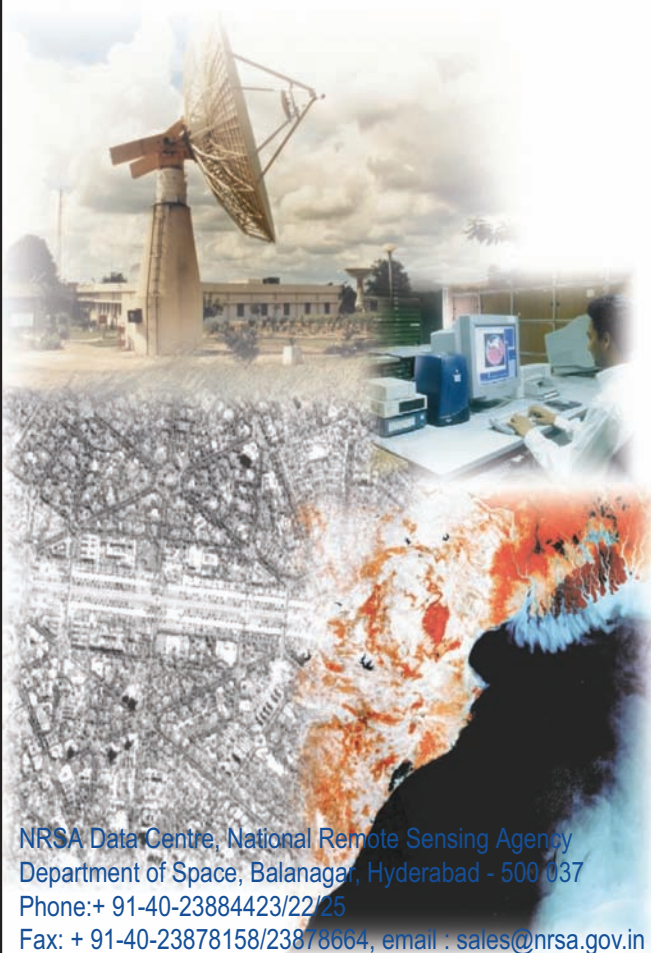
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Plunging into trouble

The government seems to have grossly overestimated the country's usable water resources

ARCHITA BHATTA *Delhi*



If the government is to be believed there is enough usable water in the country to meet projected demand until 2050. Stumped by this claim, scientists at IIT Delhi and Jamia Millia Islamia, New Delhi, pored over official calculations for estimating the country's water resources. They say the government has overestimated its usable water resources by at least 66 per cent.

How could the estimate be so grossly inflated? "The government bodies have ignored the interaction between surface and ground water and calculated the groundwater that comes to the surface and flows in the river twice. Hence usable water resources estimated by it are much higher than the actual amount," says N K Garg, professor, Department of Civil Engineering, IIT. Garg, along with Q Hassan of Jamia Millia Islamia, has contested government claims in a paper published in *Current Science*, October 10, 2007.

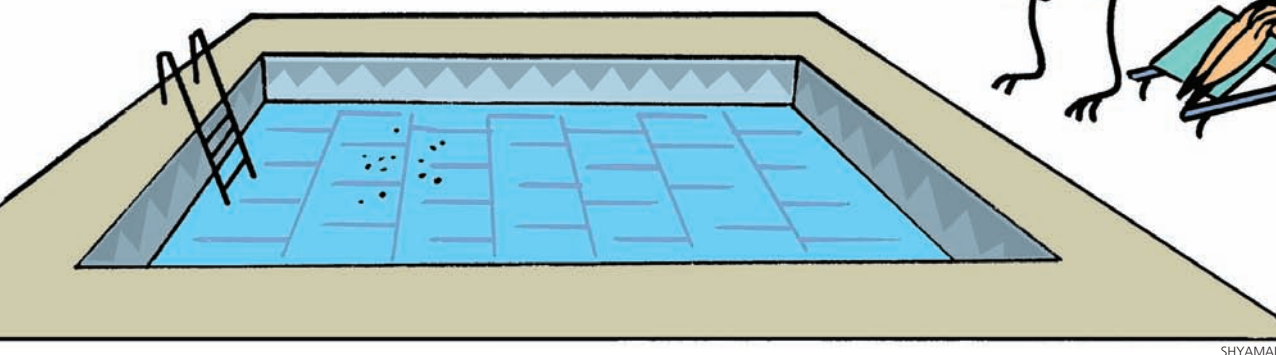
The Central Water Commission

(CWC) estimated in 1988 the total utilizable water in the country at 1,110 billion cubic metre (BCM), which is more than the projected demand of 897 BCM in 2050. "We have estimated the utilizable surface water from the data collected at 945 hydrological observation stations in the country. This came to 690 BCM. To that we have added 418 BCM, which is the utilizable groundwater estimated by the Central Ground Water Board (CGWB). Within these calculations we have already subtracted the groundwater that comes to the bed of the river. Garg is asking us to subtract it twice which is not correct," says S K Sinha, chief engineer, Basic Planning, CWC.

Garg stresses that CWC has not been able to explain its surface water estimate of 690 BCM and doubts it was taken from observation stations. "It is the same figure as used by the National Commission on Agriculture (NCA) in its 1976 estimates. I have shown this by matching the figures basin-wise," he says.

The paper claims that while NCA was careful to break the total usable surface

Any planning based on faulty water estimates is bound to spell trouble



SHYAMAL

Double take

Water calculations—and recalculations

<i>National Commission on Agriculture (1976)</i>	
Usable live storage	250 BCM
Regenerated groundwater flow into river	450 BCM
Total usable surface water	700 BCM (250+450)
Usable groundwater due to recharge by irrigation	350 BCM
TOTAL USABLE WATER	1,050 BCM (700+350)

<i>Central Water Commission (1988)</i>	
Total usable surface water	690 BCM
Total usable groundwater	418 BCM
TOTAL USABLE WATER	1,108 BCM

<i>GARG'S INTERPRETATION OF CWC CALCULATIONS</i>	
Usable live storage	240 BCM
Regenerated groundwater flow into rivers	450 BCM
*Total usable groundwater	418 BCM
TOTAL USABLE WATER	1,108 BCM

GARG SAYS CWC CALCULATION SHOULD HAVE BEEN

690 BCM – 450 BCM + 418 BCM = 658 BCM

GARG'S OWN CALCULATIONS

Projected usable live storage	308 BCM
**Groundwater recharge due to rainfall	313 BCM
***Recharge due to irrigation	47 BCM
TOTAL USABLE WATER	668 BCM

*Garg claims CWC uses total usable groundwater without breaking into recharge from rainfall and irrigation, so it should have deducted regenerated groundwater flow in rivers; **Based on 2006 data

***According to Garg's calculations based on data in a 1999 report by the National Commission for Integrated Water Resources Development Plan developed by the Ministry of Water Resources

water into usable storage of reservoirs and base flow—the non-monsoon flow in rivers taken as the groundwater regenerated as surface water—and add to it only the groundwater regenerated by irrigation, CWC ignored this and added the total usable groundwater to it (see table: *Double take*). Therefore, the base flow (450 BCM) should be deducted from the CWC estimate of 1,110 BCM, claims the paper. This would bring down the total usable water estimate to 658 BCM.

Using the latest available data for live storage, recharge through irrigation and rainfall to get a more accurate estimate, Garg calculates India's total usable water resources to be 668 BCM. "I have used CWC data. I have not used any new method of calculation. It is the same conventional method that is used. I have only shown that they have made a mistake in conventional calculations," says Garg.

Doubts remain

While agreeing that government estimates are erroneous, other experts doubt that the margin of error is as much as claimed in the paper. They have called for re-examination of data and how they are arrived at. Ramaswamy Iyer, former secretary of CWC, says, "There was a difference of opinion on whether the available water registered at the terminal points of the river systems included the estimate of groundwater availability. It would indeed be wrong to add the two numbers because some of the groundwater finds its way back to surface water flows. What is not clear is how much. So far as I know, definitive answers to these questions are not available. My recollection is that the discus-

sion on these matters in the commission was inconclusive."

Himanshu Thakkar of South Asia Network on Dams, River and People, an NGO working on problems related to water resources, questions Garg's paper for uncritically accepting the NCA estimates and using outdated (1997's) data for usable storage capacity of reservoirs. Garg, however, says he used whatever data was available.

Thakkar also points out other flaws in the method of calculation. "The analysis wrongfully assumes that reservoirs will be filled to 100 per cent capacity and that 20 per cent will be (evaporation) losses. This is rather too simplistic. Also, a storage is used multiple times, getting filled even as water is being used, and there are inflows after the monsoon as well. Thus, a 100 million cubic metre storage could provide water up to 200 million cubic metres if inflows are available," he adds.

Scientists want the data to be scrutinized. "We should look at how the figures are arrived at. Besides, there should be more transparency in collection and dissemination of data," says A K Gosain, professor at the civil engineering department of IIT Delhi. The flow data of many river basins, including the Ganga, Brahmaputra and Indus basins, is confidential. This, says Gosain, hampers researchers in calculating water usage. So does lack of regular updates on impacts of climate change, new hydrological projects and dams, and changes in water usage.

Some steps are being taken to address these issues. Gosain says a new sub-committee under the Climate Change Committee of the environment and forests ministry is studying the change in rivers' hydrological flow. A new project under him has begun studying the usage patterns by dividing river basins into smaller components and identifying the users in these watersheds.

Accurate estimate of the quantity of water, however, is not enough. The quality of water is equally important in assessing usable resources. "No attempt is being made to quantify good quality water," says Gosain. It is crucial for sound planning. ■

Flow data of many rivers are secret. Can we rely on water estimates?

Hiware Bazar, a village in Maharashtra's drought-prone Ahmednagar dis-

trict, was sliding into an abyss

after degrading its environment. But in less than a decade it turned itself around: into one of the most prosperous villages of the country. There was no magic wand, just common sense. It used funds from government schemes, to regenerate its natural resources—forests, watershed and soil—led by a strong village body. It had a role model in the district—Ralegan Siddhi, the village Anna Hazare turned around. Now Hiware Bazar is in turn an exemplar for the whole of Ahmednagar district, where others have used the same scheme to conserve and prosper. NEHA SAKHUJA travelled the district and came back with an inspirational story

54 millionaires in

PHOTOGRAPHS: NEHA SAKHUJA / CSE



Sunderbai Gaekwad took the toughest decision in her life a decade ago—to return to her village from Mumbai. Even the precarious existence in Mumbai's slums looked good in comparison to life in Hiware Bazar, her village in Maharashtra's semi-arid Ahmednagar district, hit by constant drought and crop failure. "The village didn't offer any hope," she says. Gaekwad doesn't regret the decision. "This year, I earned Rs 80,000 from the onions I grew on 8 acres (over 3

hectares, ha). I am no more a daily labourer," she says.

Gaekwad returned to the village in 1998 after hearing that the state's Employment Guarantee Scheme (EGS) was being implemented in her village. "Work on demand was the incentive," she says. "But what made the difference was the water conservation work that the village took up using the scheme." Gaekwad started sharecropping soon after her return on 2 ha. Water ensured by watershed development gave assured returns; wages from EGS work supplemented that. In 2007, she bought 3 ha with a bank loan and started growing onions. The *gram sabha* (village council) stood guarantee. She doesn't need EGS work anymore, like most other villagers.

Returning home

Gaekwad's story is emblematic of Hiware Bazar's reversal of fortunes. In the past decade, people who had left the village in search of work have been returning in a steady stream. Going by the official panchayat records, 40 families returned to the village between 1992 and 2002 from Pune and Mumbai. They had migrated out in the late 1970s and early 1980s. With the return of these families, the number of households increased to 216 in 2007. This reverse migration began in 1995 with the implementation of the EGS, but the seeds of the turnaround were sown a few years before that.

In the 1970s, Hiware Bazar, famous for her champion Hind Kesari wrestlers, lost its fight against ecological degradation. With just 400 mm of annual rainfall (Maharashtra's Marathwada region in which the district lies gets 882 mm), the village needed to protect the forests in the surrounding hills—its catchment areas—but didn't. "The naked hills shocked the elders in the village. They were home to mogra flowers and fruit trees once," remembers Arjun Pawar, the *sarpanch* of the village from 1975 to 1980. As the hills got denuded, the runoff from the hills ruined the fields. Agriculture became unrewarding. Drought was chronic and acute—a slight drop in rainfall resulting in crop failure. The village faced an acute water crisis, its traditional water storage systems were in ruins.

In 1989-90, hardly 12 per cent of the cultivable land could be farmed. The village's wells used to have water only during

a village

Though the turnaround for the village began in earnest with the implementation of EGS, people had started working towards a revival earlier. The panchayat elections of 1989 were an important milestone. Pawar, who won unopposed, immediately started work for water conservation.

The district was brought under the Joint Forest Management programme in 1992. In 1993, the district social forestry department helped Pawar regenerate the completely degraded 70 ha of village forest and the catchments of the village wells. With labour donations, the panchayat built 40,000 contour trenches around the hills to conserve rainwater and recharge groundwater. Villagers took up plantation and forest regeneration activities. Immediately after the monsoon, many wells in the village collected enough water to increase the irrigation area from 20 ha to 70 ha in 1993. "The village was just getting a bit of life back," remembers Pawar.

In 1994, the *gram sabha* approached 12 agencies to implement watershed works under EGS. The village prepared its own five-year plan for 1995-2000 for ecological regeneration. The plan was the basis on which EGS was implemented. It ensured that all departments implementing projects in the village had an integrated plan. "We started out in 1995 with EGS work under forest department officials, building contour trenches across the village hillocks and planting trees to arrest runoff," says Tekral Pandurang, a farmer who worked under EGS.

In 1994, the Maharashtra government brought Hiware Bazar under the Adarsh Gaon Yojana (AGY). AGY was based on five principles: a ban on liquor, cutting trees and free grazing; and family planning and contributing village labour for development work. The first work it took up was planting trees on forest-

Hiware Bazar is a good example of how state schemes work if people have the power to decide

the monsoon. Families began to shift out, first seasonally, then permanently. Those left behind further cleared the dwindling forests for survival. "Even government officials shifted out and soon Hiware Bazar became a punishment posting," recalls Maruti Thange, a 56-year-old farmer. Shakuntala Sambole, a 50-year-old villager now an *anganwadi* helper, recalls the days when water was not available. "I abandoned farming my 7 acres (2.8 ha) and became an agricultural labourer, earning Rs 40 a day," she says. Now she has bought 4 acres (1.6 ha) more and grows tomatoes and onions. She earns around Rs 100 a day just from selling vegetables.

Today, a fourth of the village's 216 families are millionaires. Hiware Bazar's *sarpanch*, Popat Rao Pawar, says just over 50 families have an annual income over Rs 10 lakh. The per capita income of the village is twice the average of the top 10 per cent in rural areas nationwide (Rs 890 per month). In the past 15 years, average income has risen 20 times.

Implementing EGS

Hiware Bazar has scripted this miracle by using EGS funds to regenerate the village's land and water resources, by creating productive assets like water conservation structures and forests. "Living in the rain shadow area with less than 400 mm of rainfall per annum has its blessings only when you know how to manage water," says Pawar.



Water Balance Sheet, 2007

From scarcity to surplus

Source of water	Quantity of water in million litres
Runoff from rainfall	3,150
Potential water available	3,077
Water lost	
Water as runoff	88.70
Water lost as water vapour	1,077
Water available	
Stored surface water	153.90
Water that percolates into the earth	307.70
Groundwater from water harvesting structures	526.70
Sub-soil water as moisture or groundwater	923.10
Total water available	1,911.30
Water demand in the village	
Drinking water (humans and animals)	33.90
Irrigation	2,295.50
Additional/peripheral farming activities	38.20
Total demand	2,367.60
Water required (deficit / surplus)	-456.30

Source: Department of Groundwater, Ahmednagar

Intense cropping

Hiware Bazar is getting more out of its land

Land use	1996-97	1998-99	2002-03
Gross cropped area (ha)	821	1,007	1,125
Net cropped area (ha)	723	730	748
Multi-cropped area (ha)	99	276	377
Cropping intensity	1.140	1.380	1.500

Source: Talathi (village accountant) records

land; people were persuaded to stop grazing there. To implement this, the village made another five-year plan. An integrated model of development with water conservation as its core was adopted. An NGO, the Yashwant Agriculture, Village, and Watershed Development Trust, was created as the implementing agency for development works under AGY. "Villages and the government should be partners in development; but villages must be in the driver's seat," says Pawar.

The village invested all its funds on water conservation, recharging groundwater and creating surface storage systems to collect rainwater. The 70-ha regenerated forest helped in treating the catchments for most wells; 414 ha of contour bunding stopped runoff; and around 660 water-harvesting structures caught rainwater. The state government spent Rs 42 lakh under EGS in the village to treat 1,000 ha of land, at Rs 4,000 a hectare. It was money well spent.

Miracle of water

Hiware Bazar is now reaping the benefits of its investments. "The little rainfall it receives is trapped and stored into the soil," says Deepak Thange, who worked on its watershed programme. The number of wells has increased from 97 to 217. Irrigated land has gone up



With increased grass and water, livestock and milk production increased



from 120 ha in 1999 to 260 ha in 2006 (see table: *Intense cropping*). Grass production went up from 100 tonnes in 2000 to 6,000 tonnes in 2004. Sakhubai Thange, a 70-year-old villager who has been cutting grass for the last 25 years, recalls the time when overgrazing had made grass scarce. "The efforts put in by the people of the village for soil and water conservation have created a surplus," she says. The grass-cutting season lasts three months, beginning Dussehra. Nearly 80 people go to the forest to collect grass. Rs 100 per sickle has to be deposited with the Village Development Committee, says Sakhubai Thange. Her son, Sambhaji, who accompanies her to collect grass, says, "Residents of Bhuvre Patar village come here to collect grass, aspiring to be like us."

With more grass available, milch livestock numbers have gone up from 20 in 1998 to 340 in 2003 according to a government livestock census. Milk production rose from 150 litres per day in the mid-1990s to 4,000 litres now. In 2005-06, income from agriculture was nearly Rs 2.48 crore. Projections are that the 2006-07 figures will be substantially higher, after a good monsoon, with onions alone having been estimated to fetch Rs 1.8 crore.

According to a 1995 survey, 168 families out of 180 were below the poverty line. The

The gram sabha was the force behind village regeneration. It took decisions consensually and people listened



Massive plantation and contour trenching revived the village's watershed



One of the many structures that helped capture rain, recharge groundwater



Grass yield increased. Village's role in protecting forest earned it state award

- Gaathan (residential area)
- Nullah bunding
- Grazing land
- Percolation tank
- Loose boulder
- Ponds
- Panchayat land
- Private land
- Forest land
- Storage bandharas
- Earthen structure

number fell to 53 in a 1998 survey. There are now only three such households in Hiware Bazar. "There has been a 73 per cent reduction in poverty, due to profits from dairying and cash crops," says Pawar. The village has developed its own set of BPL indicators: access to two meals a day; capacity to enroll at least two children in school; and expenditure on health. According to Pawar, those who can't spend Rs 10,000 a year as under these heads are considered below the poverty line in Hiware Bazar. This is around three times higher than the official poverty line. Nobody asks for work under the National Rural Employment Guarantee Act (NREGA), which has replaced EGS on a nationwide stepped up scale.

Hiware Bazar's strong, participatory institutional set-up has facilitated success. The *gram sabha* has the power to decide on a range of issues, including identifying sites for water harvesting structures, sharing water and types of crops to be cultivated. The village voluntary body is its implementing arm.

The village's biggest innovation is its water budget (see box: *Water audit*). The village's second five-year plan (2000-2005) focuses on sustainable uses of the regenerated wealth. Habib, a volunteer with the Yashwant trust and Hiware Bazar resident, says, "The essence of the experiment in watershed literacy comes from the *gram sabha*. It is here that decisions are made. The greatest environmental planners are the villagers themselves."

Water audit

Annual budgeting helps rational use

Since 2002, Hiware Bazar has been doing an annual budgeting of water assisted by Ahmednagar district's groundwater department. Every year, the village measures the total amount of water available in the village, estimates its uses and then prescribes the agricultural cropping pattern to be taken up. "The village decides on the crops to be grown consensually," says Shivaji Thange, who works with the village watershed committee.

After five years, the village has been able to identify its average water availability. It is estimated that with 400 mm of rainfall, Hiware Bazar is self-sufficient. It receives an average rainfall of 350 mm to 400 mm, experiencing a shortfall of 50-80 million litres. Realizing this handicap, the *gram sabha* has banned borewells. "The discipline on this decision is maintained," says Thange.

"The audit begins with monitoring the groundwater level of the six observation wells identified in the village, along with the amount of total rainfall received measured by the village's three rain gauges. The sum of rainfall and groundwater is the water available," explains Ramesh Bagmar, assistant geologist with the district groundwater department.

The *gram sabha* budgets water for the village. Water for drinking (for humans and animals) and other daily use gets priority. Seventy per cent of the remaining water is used for irrigation. The remaining water is used to recharge groundwater.

In 2004-05, Hiware Bazar found a deficit of 86.5 million litres of water after receiving annual rainfall of 237 mm. This was followed by another deficit year in 2005-06 with a 47.7-million litre shortfall after the village received 271 mm of rainfall. "The village had changed its cropping pattern and priority was given to crops like moong, bajra and gram, which require less water. This helped them handle the deficit of 2004-05 and as a result the deficit of 2005-06 did not have any major impact on the cropping pattern," says Bagmar.

In 2006, the village received 549 mm of rainfall and had a surplus of 1,465 million litres of water, which encouraged them to take up wheat on 100 ha of land and jwari on 210 ha. However, in 2007-08, the village only received 315 mm of rainfall and registered a deficit of 456.3 million litres (see table: *Water balance sheet, 2007*). The *gram sabha* has decided to reduce the land for jwari to 2 ha and wheat to 70 ha. More land will be allocated to moong and bajri.

"This water audit has been very useful in ensuring sustainability of both agriculture and water available for drinking purposes for humans and livestock in the village," says Pawar.

During 2003-04, there was a drought in the district and there was a drinking water scarcity. Hiware Bazar was the only village in Nagar block, which did not need tankers. "That year, our village did not cultivate any major crop like wheat, bajra and had to switch to drip irrigation for crops like tomatoes and onions," Pawar says.

Save up on a rainy day

The Ahmednagar lesson: drought-proofing is about managing both plenty and scarcity

Akolner village resumed its lucrative floriculture in 2005—three years after abandoning it due to drought. Raghu Thange, a farmer, has earned Rs 5 lakh this financial year selling chrysanthemums. The 15-metre open well on his 5-ha plot has water up to 6-8 metres. He has now bought five cows and plans to use organic manure for the next phase of floriculture.

The village has learnt bitterly from the drought, says Anil Mehetre, former *sarpanch* of Akolner. The memory of this period—spread over three years from 2001 to 2003 has still not disappeared. The first ever cattle camp had to cater for more than 400 animals in the village; fodder was scarce, prices shot up to Rs 600-700 per tonne; crops had virtually failed even as people drilled deeper and deeper to extract groundwater for irrigation. The village became notorious as the ‘tube-well-village’ as the flower and vegetable farmers struggled to keep their operations going. “Ten tankers visited the village

hold water and over 100 earthen plugs—loose boulder dams were made on the drains to impede the flow of rainwater and to recharge groundwater.

The difference, the village leaders say is noticeable. While floriculture has resumed with added water in the wells, the big change they see is in the attitude of people. “In the past, when we had good rainfall we still needed tankers to provide us water in peak summer. But we have not seen a tanker for the past two years. Now when it rains, the water stops,” says Thange. “The water level in the wells, which had plummeted to about 90 metres in 1998, is now stable at 10.5 metres in 2007,” confirms Sarode Sarkale, the block agricultural officer of Nagar block.

The challenge remains as villagers continue to exploit groundwater. When asked whether the village had any restrictions on the crops it grew, Mehetre voiced his helplessness. He



SUNITA NARAIN / CSE

The challenge in Akolner is to use groundwater judiciously. It can't always be ensured

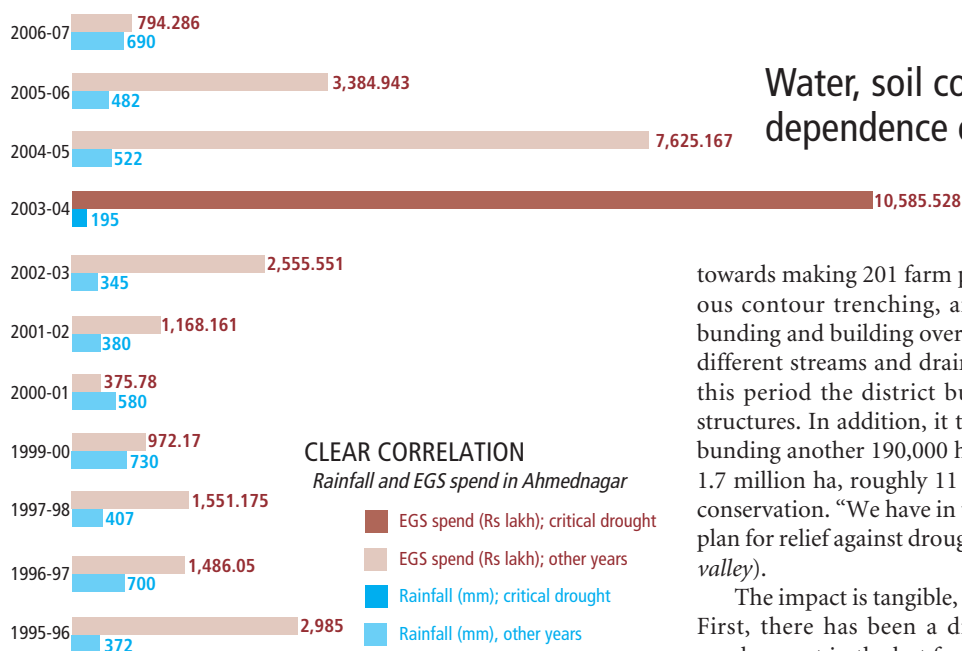
every month to provide relief for water scarcity,” says Mehetre. He recalls that the entire village was in a state of deep crisis. People asked him to resign from the post of *sarpanch*.

When the state soil and water conservation directorate approached the village for work under EGS, there were ready takers. The agricultural department suggested work on small water structures. “During that period, almost 2,500 people worked on these structures in the village,” says Mehetre. The officials of the directorate explain that during the drought, the village treated almost 400 of its 2,000 ha area for soil and water conservation by building bunds along agricultural fields. In addition, the five micro-watersheds in the village were worked upon—200 ha of continuous contour trenches were dug to

said it was not possible to restrain villagers from exploiting groundwater or growing water-guzzling crops. But he also said there was one difference in this good rain period: now people were taking on drip irrigation so that they could better conserve water.

Thange confirmed this. “I do not want to repeat the experience of the last drought,” he says, adding that he has already put in drip for his vegetable and floriculture field. He believes he will have answers when next the rain fails.

This is the question that haunts the district. Every two-three years the rains fail; sometimes for over three years in a row. When this happens the district goes from prosperity to near destitution. Every time it is more difficult to recover:



Source: Department of Agriculture, Ahmednagar

farmers are deeper in debt and more distressed. But this year there is a new confidence. “We can cope with less than normal rainfall because we have invested during the drought in soil and water conservation,” explains Vikas Patil, director, department of agriculture of the district.

Ahmednagar district lies in the Maharashtra plateau, with flat agricultural land on undulating terrain. In most seasons, the hills are bare and dry. Farmers survive mainly on groundwater and levels are declining. Rainfall is variable. In the past 15 years, many years the rains have almost totally failed—even when rains have been bountiful water has been scarce. The average rainfall is around 400-500 mm. But it’s persistent failure that breaks the district’s back—this happened from 2001 to 2003. Drought and devastation took over.

Water, jobs and soil

In Ahmednagar, there was a clear correlation between the intensity of drought and EGS spending on watershed work and soil conservation (see graph: *Clear correlation*). In 2003-04, the critical drought year, spending shot up to almost Rs 106 crore, a big chunk of the total of Rs 338 crore spent between 1995-96 and 2006-07. This Rs 106 crore went

Water, soil conservation led to reduced dependence on state for work

towards making 201 farm ponds, doing 20,000 ha of continuous contour trenching, another 3,400 ha of compartment bunding and building over 1,000 check dam-like structures in different streams and drains to improve water harvesting. In this period the district built over 70,000 water-harvesting structures. In addition, it treated through trenching and field bunding another 190,000 ha. Of the district’s area of just over 1.7 million ha, roughly 11 per cent was worked upon for soil conservation. “We have in these years of scarcity used funds to plan for relief against drought,” says Patil (see graphic: *Ridge to valley*).

The impact is tangible, say officials, citing three indicators. First, there has been a drastic decline in the demand for employment in the last few average and high rainfall years. In 2006, the district spent as little as Rs 7 crore on building water structures. “No one is ready to work on our public employment programmes. This is because agriculture is booming and labour is short,” says Uttam Rao Karpe, the chief executive officer of the district’s *zilla parishad*. This year he says nearly Rs 50 crore lies unspent of the funds for soil and water conservation. A look at the employment demand statistics shows that April-December, 2007, only 7,000 households demanded work, as compared to the 30,000-odd in 2006-07 under NREGA.

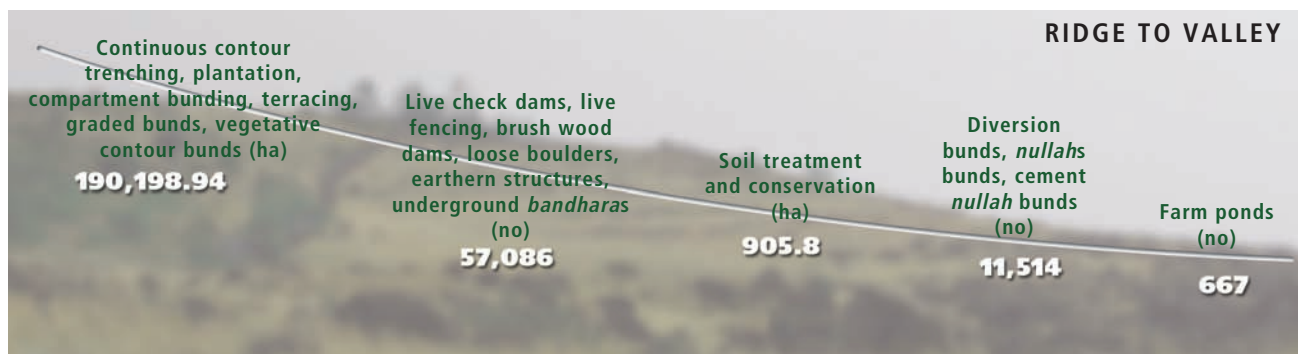
Secondly, the area under crops has increased, farmers have moved to cash crops and yields have risen. “Agriculture has become productive and lucrative,” says Karpe. The best indicator is that while during drought there was a desperate shortage of fodder and farmers preferred not to sell sugarcane but use it as fodder, now there is excess sugarcane in the district, say officials.

Thirdly, and key, is the improvement in the water table of the district because of soil and water conservation. In the district, roughly 20 per cent of the 1.2 million ha of cultivated land is irrigated. But the bulk of this—75 per cent—is well irrigated. Farmers use dug-wells, which tap the shallow aquifers, and increasingly deeper and deeper tubewells for cul-



“We can cope with below normal rainfall because we have invested in soil and water conservation”

—VIKAS PATIL



Source: Department of Agriculture, Ahmednagar



GROUNDWATER-RAINFALL

Well: Vakodi

Watershed number: SA2, Nagar block

Depth of well: 19.6 metres

■ GROUNDWATER LEVEL
..... RAINFALL

Source: Department of Groundwater, Ahmednagar

tivation. The district groundwater authorities monitor 200 wells to check water levels. Their data shows, on average, there has been a 5-metre rise in water levels between the peak drought period of 2003 and 2007. Analysis of individual wells across different watersheds confirms this trend. While water levels dropped to 19 metres during the drought of 2003, the near average rainfall the following year has seen an increase and stabilization. Less than average rainfall is not a problem anymore.

The key challenges in the future will be to improve productivity, with use of techniques to minimize water use and changing cropping patterns. "The district administration is promoting drip irrigation to counter the increasing use of borewells," says Patil.

The next big challenge, say officials, is to protect watersheds—mostly lands under the forest department. "Till now we have mainly worked in the storage zone and recharge zone, not in the upper areas of the watershed," says Ajay Karve, deputy director, district groundwater department.

In some cases, labourers could not be motivated to work in the hilly areas due to the lower wages prevailing there, says Mahesh Baosar, the forest range officer who supervised watershed works in upstream areas. "In some villages of the district the areas under watershed projects were treated twice, both by the forest department and agriculture department which has implemented majority of watershed works in the district," says Baosar.

"The next phase needs to focus on runoff or hill areas," suggests Karve. This will ensure the district is drought-proofed.

The message from Ahmednagar is clear: if we can create productive assets then drought relief can become drought-proofing. Currently 330 districts in India are implementing NREGA. The question is what will the money for employment be spent on? Between 1995 and 2006, Ahmednagar spent Rs 340 crore, or Rs 28 crore a year on soil and water conservation. This has allowed it to cope with drought.

Under NREGA, each district, on average, has spent Rs 44 crore, but the bulk of this has not been on water conservation. Despite the officially stated 'non-negotiable' focus on water and soil conservation, funds in most states are being spent on roads and buildings. Till July 2007, 22 other states have negligible allocation for water conservation. Three states—Andhra Pradesh, Madhya Pradesh and Rajasthan—accounted for 96 per cent of water conservation works under NREGA.

The second lesson is 'how' the drought relief money should be spent to create productive assets. In Hiware Bazar, the village panchayat evolved a five-year plan. It then used the money provided by different government schemes—from EGS to the Total Sanitation Programme—to work its plan. It first treated the forest and the catchments for its village wells; it then took up water conservation and soil conservation. It used short-term drought relief funds for long-term development.

This will be the biggest challenge for NREGA. Conceptually, decentralization is part of the scheme. The village has to make a development plan; the district has to make a perspective plan; the projects have to be cleared by the *gram sabha* and implemented by the panchayat. The question now is how this scheme can indeed replicate the lessons of Hiware Bazar.

The third lesson is the role of coordination between the 'on what' and 'how' factors. In Ahmednagar, it is clear that the potential of water conservation will only be realized when the

watersheds under the control of the forest department are part of the programme. But even that is not enough. These watersheds, which are used intensively by people to graze their animals, will only be protected if people are involved in planning and reap the benefits. Similarly, all the water recharged through soil conservation and water-harvesting work will not be enough if people overuse and over-exploit. This will require the management of plenty as much as that of scarcity.

It is here that village institutions like those in Hiware Bazar hold the key. While every village may not be able to curtail the use of water or control cropping patterns, it is clear that local leaders will have to find ways of dealing with sustainability. They know that the failure of rains is inevitable. The question is if they can make sure that when the rains fail, drought is not inevitable. ■

NREGA managers will have to learn from Hiware Bazar to make an impact



A deadly yoke

Toxic feed becomes cattle killer in Sindh province

SHAHID HUSAIN *Karachi*

High inflation and the absence of certified feed mills in Pakistan's Sindh province is forcing dairy farmers to use stale bread—*bhosi tukra*—in cattle feed. This practice has already caused a catastrophe, when 493 animals died in Karachi's Landhi Cattle Colony in November last year. More than 1,200 animals fell sick.

"A report released by the Pakistan Council of Scientific and Industrial Research (PCSIR) has concluded that deaths were caused by a high concentration of aflatoxin in cattle feed," says Hafeez Shaikh, a vet at the Landhi Cattle Colony. "According to the US Food and Drug Administration the concentration of this naturally occurring toxin in cattle and poultry feed should not exceed 20 microgramme per kg. But the PCSIR report showed the aflatoxin concentration was as high as 200 microgramme per kg in the Landhi Colony samples," Shaikh adds.

Samples of dead flesh were sent to

executive district officer, livestock and animal husbandry, city district government, Karachi, who has been suspended for negligence after the Landhi incident.

Landhi Cattle Colony has about 400,000 animals and supplies 50 per cent of Karachi's milk requirement. The 16-million megapolis has other cattle colonies and the interior of Sindh sup-

He says it is time the government established a laboratory in the area for timely detection of toxins in cattle feed besides establishing certified feed mills across Sindh province.

Media reports suggest that more than 2,000 mature animals of productive age and about 500 calves are slaughtered daily at the Landhi Cattle Colony.



REUTERS

Farmers have to mix fodder with stale bread. The bread is often stored in godowns for a long time making them toxic

the Central Veterinary Diagnostic Laboratory, Tandojam, Sindh, but no bacteria or virus was found. Experts such as Shaikh have an explanation for the toxicity caused by stale bread: "Usually, cattle feed comprises cotton seedcake, wheat bran, wheat crush, pulses, wheat straw and green fodder. But these days, farmers have to mix this with stale bread collected from houses. The bread is often stored for long in godowns, where they become toxic."

The milk bowl

Toxic food had affected Landhi Colony earlier as well. "In 1997, cotton seedcake poisoned by excessive pesticide use killed many animals," says Mohan Lal,

plies a substantial portion of milk to the city. But as Shaikh points out, "The demand can't be met without the 1.6 million litres supplied from Landhi Cattle Colony every day."

Too congested

The cattle colony was established in 1958 over 300 hectares when the area was almost uninhabited. But it has become very congested since then. This can be gauged from the fact that a farm with a capacity to house 90 buffaloes and cows is crowded by 400 animals on average. "We have been lucky that there has been no major outbreak of a contagious disease. But overcrowding does pose a threat," says Shaikh.

A large number of animals are sold to slaughterhouses the moment they stop lactating since their owners find it difficult to feed them during the dry period. Many calves are also sold. Buffaloes remain productive till 10, but many are sold after they are three years old. The practice will result in extinction of high quality animals such as the Red Sindhi cow, Kundi and Nili Ravi buffaloes and the famous Sahiwal cow, say experts.

The average daily production of milk in Pakistan is about 130 million litres, but hardly 2 per cent of the milk sold in the country is pasteurized. Seventeen units, including three run by multinationals, manufacture dairy products, but environmental pollution as well as an inadequate supply chain are hampering the growth of Pakistan's dairy industry. "Cattle colonies and dairy farms should be established on scientific lines," Shaikh says. ■

Coal-fired threat

Mega power projects threaten Ratnagiri's Alphonso mangoes and fishery

KIRTIMAN AWASTHI *Jaigad, Ratnagiri*

It could be a bitter end to a sweet, juicy story. Maharashtra is planning mega power plants in Ratnagiri district, a horticulture zone known for its finest Alphonso mangoes, which are exported to Japan and Singapore. This year, farmers in the region exported the famous fruit to Europe for the first time. But they are not sure of the future of the business; they fear emissions from the plants could harm mango plantation.

What is at stake is more than the mango plantations. Two thermal power plants of a combined capacity of about 2,800 MW coming up in Ratnagiri have also raised the hackles of fisherfolk—hot effluents discharged into the sea

cultural Practices, has said that in case of pollution from the thermal power plants, the certificate cannot be granted. This certification is a must for entry into European markets. The people in the region allege that the JSW Energy plant violates the environmental clearance process and the Coastal Regulatory Zone (CRZ) notification, 1991.

They do not understand why the government wants power plants in an ecologically sensitive area. The Ratnagiri-Sindhudurg Regional Plan for 1981-2001 cautions that authorities must develop a suitable strategy for all the developmental projects in the region since it is ecologically very sensitive. In 1991, the Maharashtra government declared it a “horticulture preferred”

Ratnagiri's Alphonso mangoes are exported to Europe, Singapore and Japan. Maharashtra has declared Ratnagiri an export zone for mangoes

could hamper fish breeding. While one plant by JSW Energy Ltd at Nandivade is under construction, the other in Dhopave by Dhopave Coastal Power Ltd is awaiting the green light from the Union Ministry of Environment and Forests (MOEF). Besides, a nuclear power plant of 6,000 MW is in the pipeline.

This, when the state government has declared Ratnagiri an export zone for mangoes. A representative from Food-Cert, which issues certificates under the European Retail Parties Good Agri-

area. Government figures show that over 450,000 people are employed in the horticulture sector. Since 1991, under partial funding by the state government about 258,000 hectares (ha) of plantations have come up in Ratnagiri, of which about 51,000 ha was under Alphonso mango. The other plantations are of coconut and cashew.

“But once the plants come up, Alphonso mangoes will be the worst affected,” says Vivek Y Bhide, the president of the Ratnagiri Zilla Jagruk Manch, an

organization leading the campaign against the power projects. His concerns may be valid. Studies have established that sulphur dioxide (SO₂), produced on burning coal, harms the vegetation. According to a study by scientists from the Lucknow-based Industrial Toxicology Research Centre, published in the *Journal of Environmental Contamination and Toxicology* in December 1999, SO₂ reduces the quality and quantity of mangoes. Madhav Kelkar of Pawas village, who started organic farming a year ago, fears his efforts will go waste because of the flyash and SO₂ pollution. Officials at JSW Energy, however, say that the upcoming power plant will use imported low-sulphur coal.

The residents are not convinced. Bhide sites an example from Dahanu in Thane district where the production of *Manilkara zapota*, commonly known as chikoo, declined heavily after a thermal power plant started functioning there in early 1990s. A 2004 study by the Coimbatore-based Salim Ali Centre for Ornithology and Natural History also found pollution from the plant responsible for the decline in chikoo production.

Coal and hot

There is another threat. “Flyash and hot, oxygen-poor effluents are going to be released into the sea. This will spell doom for fisheries, affecting thousands of fishermen,” says P R Arun of the Mumbai-based NGO Green Alternatives. A report prepared by the Maharashtra Pollution Control Board (MPCB) and the National Environmental Engineering



PHOTOGRAPHS: AGNIMIR BASU / CSE



Industry vs ecology

Maharashtra has reasons to push for the power projects. Its electricity demand is estimated to have touched 13,500 mw by October 2007, while the supply is about 10,500 mw. JSW Energy is one of the eight companies that signed agreements with the state government in 2005 to set up power plants. As per the MoEF website, 11 thermal power projects are awaiting environmental clearance. "Almost the whole of coastline of Maharashtra is industrialized and some parts of Ratnagiri and Sindhudurg are left intact. That is why they want to set up as many power plants in the region as possible," says Bhide. Experts, however, point out that environmental assessment should be region specific not industry specific.

Mango eater: The JSW Energy plant under construction at Nandivade

Research Institute (NEERI), Nagpur, on the JSW Energy plant on directions from the Bombay High Court, pointed out in July 2007 that "hot water discharge locations are near or on the shore. The near-shore areas are potential fish-breeding zones and hot water discharge may have adverse impact on breeding areas."

Fisherfolk experienced exactly this kind of a situation in Jaigad creek in Ratnagiri after the power plant in Dabhol was started. "For three years we did not have enough fish stock. We could start fishing again after it was closed," says Jainuddin, 75, of Jaigad.

The upcoming JSW power plant also proposes a port to unload coal near the creek. Preparing the port will require dredging; another reason for the fisherfolk to be wary. The proposed port site also harbours corals, though the rapid environment impact assessment (EIA) done by JSW Energy denied their presence. When Nandivade resident S N Jorg sent a specimen to the National Institute

of Oceanography, Goa, its scientist A R Gujar confirmed it was a coral of genus *Porites* found in calm water of lagoons.

Another problem is of coal storage. The proposed storage site is in the open on a hilltop. Farmers in Nandivade fear that in case of rain the washed chemicals will affect their crops down hill and contaminate groundwater. The MPCB-NEERI report draws the attention towards the high wind speed at the project site. It says that such conditions should be considered in planning the handling of coal and flyash, and are particularly relevant in view of mango and cashew plantation in the surroundings. The report also said that the rapid EIA did not address this vital issue adequately.

Unheard

The farmers also complain of lack of transparency in public hearings for the project. The first public hearing was organized by MPCB in August 2006. It was conducted in English while villagers

wanted it in Marathi and at the plant site. "The company did not even provide the EIA report before the hearing," says Bhide. The second hearing was held in September 2006 at Nandivade. "This time local politicians, who were with the villagers during the first hearing, supported company officials. Villagers' objections were not recorded," he added. The Ratnagiri Zilla Jagruk Manch also dismissed as bogus the rapid EIA for both the proposed port and power plant. "The EIA report is a baseline document for decision-making and the rapid EIA is far from adequate for evaluating a highly polluting industry like coal-fired power plant," says Arun.

The group filed a public-interest petition in the Bombay High Court, demanding a proper hearing. In May 2007, MoEF gave clearance to the plant for five years subject to certain conditions. The ministry said no activities should be taken up in CRZ, that is, within 500 m from the sea. It recommended a detailed study of the plant's impact on the Alphonso mango plantation and fishery. Later, the MPCB-NEERI report recommended redrawing the environment management plan for the port and the plant. MPCB is yet to respond to the redrawn plan the company submitted. Environmental activists have now filed an appeal before the National Environment Appellate Authority against the clearance given by MoEF.

People say Ratnagiri has become an unofficial special economic zone for power plants when the need is for special ecological zone. ■

The proposed plant's hot water discharge locations are near or on the shore, which are potential fish-breeding zones. This can affect fishing in Jaigad creek



Genetic divide

Supreme court's clearance to Bt brinjal trials criticized

SAVVY SOUMYA MISRA

There is no stopping the Bt brinjal trials now. The supreme court on December 10 refused to stay Mahyco's (Maharashtra Hybrid Seeds Company's) ongoing trials in various parts of the country. Social activists Aruna Rodrigues and P V Satheesh had filed a petition against the Genetic Engineering Approval Committee in September 2007. The committee, under the Union Ministry of Environment and Forests, had given the clearances for the large-scale field trials in August 2007.

The petitioners said the committee's approval of trials was in violation of supreme court rulings, which, among other things, had mandated an isolation distance of 200 m between Bt and non-Bt crops (see 'SC notice on GM trials', *Down To Earth*, November 30, 2007). The committee, however, maintained in a counter-affidavit that all the orders were being followed.

The petitioners say the trials will be over till the next hearing is conducted in February. "The apex court's order could have dangerous consequences. Large-scale trials for Bt brinjal raise the risk of contamination by almost ten-fold. The

trials are nothing short of criminal negligence," says Rodrigues.

Hyderabad-based Centre for Sustainable Agriculture (CSA), through a right to information application, had found that some states carrying out GM trials had not formed the mandatory state biotechnology coordination committees and district-level committees. The Environment Protection Act, 1986, states that the committees should be formed to periodically review the safety and control measures in institutions handling GM trials. They found that although there are two multi-location research trials of Bt brinjal in Delhi—at Alipur and Hamidpur—neither of the committees was formed there.

The situation is similar in Jharkhand and Bihar where permissions have been granted for multi-location research trials for Bt okra. The Department of Biotechnology's

Review Committee on Genetic Modification had given permissions for okra trials in May 2007.

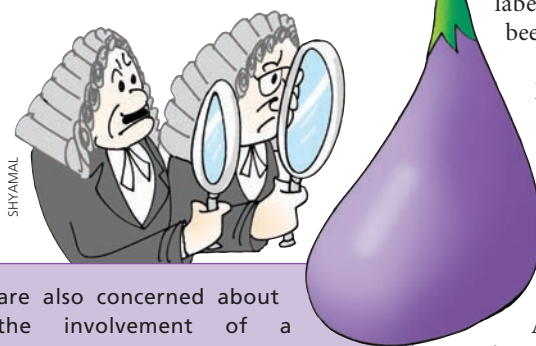
No labels

Activists are getting worried over the increased appearance of GM food products in markets. Food products are being imported with soya, corn, canola and cottonseed ingredients from GM-producing countries without any labels, says G V Ramanjaneyulu of CSA. He also suspects GM contamination in other products like tomato juice, tomato ketchup and potato chips.

To discuss the "unabated flow of GM products", Ramanjaneyulu and Kavitha Kuruganti, from CSA, and Rajesh Krishnan of Greenpeace India, met Jairam Ramesh, the minister for state for commerce, on November 28. The commerce ministry had earlier issued a notification in April 2006 to make labelling mandatory. But it hasn't been implemented.

In March 2006, the Union Ministry of Health and Family Welfare had accepted the Indian Council of Medical Research's recommendations to label GM food (see 'Legally modified', *Down To Earth*, April 30, 2006). The Food Safety and Standards Act, 2006, was supposed to take the recommendations into account but the act, though passed, has not been completely notified. But there are new protocols being formulated for GM food regulation now (see box: *More rules*).

Labelling should be mandatory for non-GM products to ensure that consumers are making an informed choice about the product they are buying and should be tested, if necessary, says Kuruganti. Krishnan says, exporters should take the responsibility. "India lacks a proper screening mechanism and has no laboratories to test the material at ports of entry. Exporters should voluntarily declare," he says. ■



More rules

The Indian Council of Medical Research along with Review Committee on Genetic Modification (RCGM) and Genetic Engineering Approval Committee is formulating protocols to assess the safety of food derived from genetically engineered crops. "The new set of protocols is aimed at the stage prior to the making of a GM seed. We will test a particular protein for toxicity and only if we find it safe, we will go ahead with it," says K K Tripathi, member secretary, RCGM. Activists, going by previous records, remain sceptical. They

are also concerned about the involvement of a Canadian company, AGBIOS, in the protocol-formation process. The United States Department of Agriculture has used the company's services for the introduction of GM crops in several countries, says Kavitha Kuruganti of Centre for Sustainable Agriculture, Hyderabad. Tripathi clarifies: "They work as a consultancy firm in India for capacity building and dissemination of safety and risk assessment of the GM crops at the ground level. But they have no role in drafting guidelines for safety of genetically modified crops."

HEALTH & MEDICINE

R_x: 60-minute *havan*

Holy smoke disinfects indoor air

THE ritual of burning medicinal plants to produce 'purifying' smoke is common to several religions. Hinduism has *havan* and Islam, *bukhur* (see box: *Smoky remedies*). Most modern physicians, though, are sceptical, saying the smoke might actually do more damage than good. So scientists at the National Botanical Research Institute in Lucknow decided to test whether *havan* smoke affected indoor air quality. They burned *havan samagri*—the mixture of aromatic medicinal herbs typically prescribed for Hindu rituals—in a closed room. They found smoke from the material did kill germs. And it was not just any kind of smoke; they compared the effects of smoke from mango wood with those of *havan* material.

"There was no reduction in the number of airborne bacteria when one kg of mango wood was burnt. But when half a kg of *havan samagri* was added to it, the bacterial count reduced by 94 per cent within one hour," said Chandra Shekhar Nautiyal, head of the division studying plant-microbe interaction at the institute. The bactericidal effect did

not diminish as soon as the source of smoke was removed. The researchers sampled air quality over 24 hours, after which the room was opened. Even at the end of the duration, the bacteria count was 96 per cent lower.

No quickfix either

Repeated sampling showed the effect lingered for a month. "The absence of pathogenic bacteria in the open room even after 30 days indicates the bactericidal potential of the medicinal smoke," Nautiyal observed. The study was published in *Journal of Ethnopharmacology* (December 3, 2007). The study may have implications for the use of smoke from medicinal herbs in confined spaces like animal barns and grain warehouses.

Airborne transmission is known to cause infection in animals and plants. The Lucknow researchers say certain known medicinal constituents from the *havan samagri* could be added to the practice of burning of farm wastes. But what about the pollution? Satish Bhat, a Vedic priest at the Maharishi Ved Vigyan Vishwa Vidyapeetham in Noida,



Effects of smoke linger for a month

BACTERIA ELIMINATED

HUMAN PATHOGENS

- *C urealyticum*: infects urinary tract
- *K rosea*: catheter-related infection
- *S lentus*: abscess in spleen
- *S xylosus*: kidney inflammation
- *T inchonensis*: causes leukemia
- *E aerogenes*: hospital infections
- *S spiritovorum*: lung infections

PLANT PATHOGENS

- *B glumae*: rots rice grain, seedlings
- *C flaccumfaciens*: wilts beans
- *P syringae*: kills cells of peach trees
- *X campestris*: black rot in mustard

SMOKEY REMEDIES

Four Iranian scientists led by Abdolali Mohagheghzadeh of Shiraz University of Medical Sciences reviewed literature from 50 countries across five continents for remedies administered in the smoke form. "The advantages of smoke-based remedies are rapid delivery to the brain, efficient absorption by the body and lower costs of production," says their September 2006 paper in the *Journal of Ethnopharmacology*. They stressed lack of knowledge of medicinal smoke and the vast potential of using it in modern medicine as a form of drug delivery.

"Most ancient drugs are still being used in the same dosage and form although smoking today is more often a form of drug abuse than therapeutic use," they say, citing the example of

marijuana. In India, they recorded that the smoke from mango leaves and date is used for treating certain skin diseases; smoke of custard apple leaves are used to treat convulsions. For modes of delivery, they found 71.5 per cent was through inhalation, 24.5 per cent through smoke directed to specific body part or organ, and only 4 per cent as ambient smoke (see p58).

Plant pathologist Y L Nene of the Asian Agri-History Foundation in Hyderabad says the size of the active particle of the plant is reduced to the microscopic scale during burning; this helps its delivery in the body. Smoke can also preserve seeds, assist germination, and enhance seedling vigour besides protecting it from harmful microbes.

Uttar Pradesh, believes if there were adverse effects, someone like him would be the first to notice them.

Is the scientific community convinced of the beneficial effects of *havan* smoke? Not T K Joshi, director of the Centre for Occupational and Environmental Medicine at Delhi's Lok Narayan Jai Prakash Hospital. "The *havan* smoke might have medicinal properties but, overall, smoke is an irritant and has a negative impact on human health," he said. S K Chhabra, cardio-respiratory physiologist at the Vallabhbhai Patel Chest Institute at University of Delhi, added a word of caution: "Smoke is an irritant. If it removed bacteria, it could be due to this property. Researchers should study the chemical properties of individual ingredients from *havan samagri* to establish this." ■



LIFE SCIENCES

Pincer attack

A new chikungunya strain—and new mutations

ARNAB PRATIM DUTTA

REEMERGENCE of the chikungunya virus in India in 2005—the first outbreak in 32 years—has baffled the medical community. It is a cryptic genetic puzzle with several plausible explanations but little evidence. The strain causing havoc in India is an African one, never virulent in India and not reported before 2000. There is also evidence of mutation in the strain between 2006 and 2007.

The last outbreak of chikungunya in the subcontinent occurred in 1973 in Barsi, Maharashtra. December 2005 saw a pandemic in Andhra Pradesh, Tamil Nadu and Kerala. The virus then hit Maharashtra and West Bengal. The reason for this outbreak has not been established. WHO says over 1.4 million cases of the disease were recorded between January 2006 and August 2007. Genetic mapping of the virus revealed the strain was not of the Asian genotype, responsible for the previous outbreaks. Instead, it was what is called the East Central South African (ECSA) strain, which in 2005 caused an epidemic in the Réunion Island in the Indian Ocean.

A team drawn from research institutes in Puducherry, Tamil Nadu and Kerala studied 13 serum samples from suspected chikungunya patients. Nine samples tested positive for the virus; eight had the African strain while one had the Asian strain. “The new strain in India is very close to the ancestral stock of the Réunion strain, which could have been transported to India by infected humans or by the vector,” said N Pradeep Kumar of Vector Control Research Centre, Puducherry, who led this team.

While the African strain has not been formally reported in India among humans before 2005, its Indian sojourn might actually be older. “In 2000, we had taken a viral sample from a mosquito from Yawat in Maharashtra for some other studies. It had the ECSA strain,” says Vidya Arankale, deputy director of the National Institute of Virology in Pune, told *Down To Earth*. Why the strain took half a decade before turning virulent is not known.

The story gets more complex when we look at mutations in the viral strains. To be effective, the strain that ravaged the Réunion Island typically requires the carrier mosquito to have a certain level of cholesterol, which is found only in the *Aedes aegypti* mosquito. In 2005, the strain developed a mutation, called A226V, which made it ‘cholesterol independent’. This meant the virus could piggyback on a wider range of mosquito species. The three-state study did not find this mutation in the ECSA strain present in India, though the ECSA strain had acquired mutations known only in the Asian strain of the virus. The plot thickens further: the National Institute of Virology, which had not found this mutation (A226V) in the African strain in 2006 samples, found it in 2007.

Kumar sounds a warning in his study: “The magnitude of the outbreak might be due to mutations other than A226V.” The microbe is spreading far and wide, and adapting to local conditions by mutating. Vector-borne diseases will only increase with climate change. The three-state study and the Pune institute’s work show Indian health administrators’ job is cut out. ■

EVOLUTION

Get shorty

Pygmies stay short to survive

SUMANA NARAYANAN

HUMAN population groups come in different heights. In India and China, people are usually short. In Canada, they are relatively taller. One school of biologists says this is due to varying food availability. A recent study of pygmies, the short bush-dwelling people of central Africa, says the reason might lie elsewhere: over centuries, their bodies have learned to remain small to divert nutrition towards reproduction. But why have their bodies learned to strike this compromise?

The answer lies in the low life expectancy of pygmies—they live for only 16-24 years. Their survival as a people depends on hitting puberty early and prioritizing reproduction over physical growth. This has pressured them to evolve into a shorter people. That’s the outcome of research by three anthropologists of Cambridge University, who



Evolution puzzle: Pygmies of Africa

studied how physical growth (height), fertility and mortality interact among pygmy populations.

They compared pygmies from Africa and the Philippines to tall populations with poor nutrition in low-income groups in the US as well as the Maasai and Turkana people of eastern Africa. They found the pygmies stopped growing at an earlier age; they also had high mortality rates and, consequently, shorter life expectancy

due to reasons that include poor nutrition, the stress of living in a tough terrain and tropical diseases.

Short life expectancy means early reproduction is naturally preferred. Since food availability is limited, the body diverts energy from food to reproduction rather than physical growth. Hence they stop growing at an early age. "This distinctive feature of pygmies is just a side-effect of evolutionary pressures that favour early reproduction, and not because shorter size is an advantage," commented Michael Dunn, an anthropologist with the Max Planck Institute for Psycholinguistics in the Netherlands.

Since science has not yet understood the evolution of the pygmies, various

Pygmies live for 16-24 years. Their bodies have learned to remain small to divert nutrition to reproduction

scholars are working on hypotheses that—varyingly—point at poor nutrition, mechanism to tackle starvation, and easier movement in dense tropical forests. But the pygmies living in cooler areas like Bolivia do not face such circumstances and are yet quite short. Contrarily, the Maasai of eastern Africa don't get good nutrition but are tall. The mystery of height in evolution got queered further in 2004, when a remarkable human fossil was discovered on the island of Flores in Indonesia; it was that of a mature person the size of a modern three-year-old child. It can't be said for certain if this is the trace of another distinct human species or just the remains of a modern human afflicted with a disease that reduced body and brain size.

It is in this context that the Cambridge anthropologists offer the findings of their inquiry. The reception of their work might add to our understanding of how the physical environment shapes evolution. Perhaps it could explain the puzzle of the Flores fossil; the challenges of survival on islands are comparable to those faced by pygmies in the African bush. Populations with abundant food can afford to grow taller and larger, to have fewer children at a later stage in life, and live longer. ■

AGRICULTURE SCIENCE

Know your tuber

Potato needs a new classification system

SAVVY SOUMYA MISHRA

2008 has been declared the year of the potato by the UN. You can expect lots of new research projects, films and exhibitions on one of the most important staple crops. Over the years, breeders have used physical features or morphology of the plant to select varieties for different uses: human consumption, industrial processing or feeding animals. Scientists at the University of Wisconsin, USA, suggest the potato (*Solanum tuberosum*) be divided into four species. They reason this will help breeders be more specific in their selections, thereby paving the way for more vigorous varieties.

The potato's centre of origin is in and around Peru in South America, from where it has spread across the world over the past five centuries. David Spooner and colleagues at the horticulture department at Wisconsin have been conducting research on the species boundaries and evolutionary history of wild and cultivated potatoes.

Why a new classification?

Almost 5,000 potato varieties are cultivated worldwide; 3,000 of these in the Andes mountains alone. Then there are 200 wild varieties. While selection and breeding based on physical characteristics is enough for farmers, it is not enough for scientific classification. "Morphology is a poor character to define most species or cultivar groups," writes the Wisconsin team in its paper in the journal *PNAS* (December 4, 2007). There should be an elaborate classification to distinguish the genetic traits of different varieties. At present, scientists count the number of similar chromosome sets—chromosomes come in sets of different numbers like two (diploid) or four (tetraploid)—in a cell of one variety to distinguish it from another. This is called the ploidy, a simplistic approach to identify varieties into broad categories. But chromosome numbers for most cultivated potato varieties are not available, making this approach unreliable. "Ploidy has been

of great importance in the classification of cultivated potatoes but our results show so many exceptions that it is a poor character to define gene pools," the paper says.

The way out, they suggest, is the genomic approach: instead of only counting the chromosome sets, it requires identification of the smaller components of chromosomes called 'bases'. They also propose cultivated potatoes be reclassified into four species because there is much confusion in identifying potato varieties collected over three decades even at the International Potato Center in Lima, Peru. "Potato gene banks are in great need of an integrated and comprehensive programme ... Such a multicomponent system will serve the breeding community much better than the unstable traditional classifications."

K R Dhiman, head of India's Central Potato Research Station at Kufri, Himachal Pradesh, believes Spooner's proposal should be used to supplement existing methods: "It promotes a molecular or a genetic basis to determine the dissimilarities in the genes between and within species. It will improve breeding practices." ■

Looks can be deceptive in selection



ENERGY TECHNOLOGY

Anaerobics

Bacteria can help get cheaper natural gas from oilfields

SOME microbes have been breaking down petroleum into methane deep within the earth for ages. But we do not know the bacteria or how they do it. A recent study has revealed the answers, with scientists producing methane from petroleum in the laboratory by feeding these microbes.

Over millions of years, some bacteria have adapted to conditions deep below the soil, deriving their energy by consuming the oil. In turn, they lace the petroleum with impurities like sulphur, thereby making it unusable without refining. "This biodegradation of crude oil ... has affected the majority of the world's oil, making recovery of the purified oil costly," said a paper published in the online edition of the journal *Nature* on December 12, 2007. The end result of the breakdown is methane.

"In a typical petroleum reservoir, you can extract 35 per cent of the oil, with 65 per cent remaining unextracted," said microbial ecologist I M Head of the University of Newcastle in the UK, one of the authors. "The equivalent figure for gas is 70 per cent and 30 per cent. If we can convert oil into methane, then the recovery of energy goes up."

A gas revolution

Understanding how crude oil biodegrades into methane opens the possibility of recovering the clean-burning natural gas directly from deep oil sand deposits. This could eliminate costly—and polluting—thermal processes employed to loosen the tar-like bitumen to make it flow into wells, from where it is pumped up.

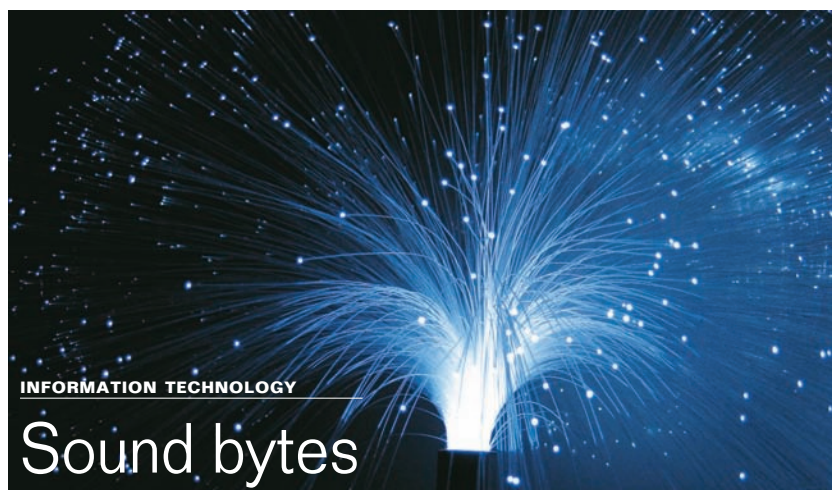
Accelerating the biodegradation also offers a route to obtaining an energy source that is otherwise difficult to recover from oil fields, said the team led by D M Jones of the University of Newcastle; researchers from the University of Calgary's School of Civil Engineering and Geosciences in Canada and the R&D Centre of Norsk Hydro Oil & Energy in Norway. The

researchers took non-degraded oil from the North Sea fields and tracked its reaction path under anaerobic conditions. In the presence of methanogenic bacteria, methane production was incubated and studied for 686 days.

Previous studies had suggested that bacteria responsible for this biodegradation were aerobic. It is now apparent that the methanogenic microbes, like archaeobacteria, work in the absence of oxygen. This is significant because the

reservoirs of petroleum do not have enough oxygen, if any at all.

If the conversion of crude into gas in the laboratory can be replicated at the commercial level, the heavy oil industry might be in for a revolution. Oil companies would then focus on recovering only the clean-burning natural gas, leaving the hard-to-handle bitumen and contaminants deep underground. The researchers said oil companies are eager to try the method in field conditions. ■



Optical fibres for storing data

OPTICAL fibre has become the mode of choice for electronic data transfer. Transmission losses are much lower than in copper wire, and the speed much faster. A team at Duke University tried something new: store data in optical fibre, like in the random access memory (RAM) of computers to cut energy loss. The experiment was successful, though only for 10 nanoseconds (nano means a billionth). The findings were published in *Science* (December 13, 2007).

Optical fibre is made of either glass or plastic and converts data into light pulses. But light cannot be stored. The Duke team discovered light pulses, which when converted to sound waves, can leave an imprint of the data on the optical fibre. For this conversion, the researchers passed two opposing laser beams through the same fibre. The opposing laser beams create vibrations called phonons, which are storable in the optical fibre.

To reconvert this stored data into

light, a third laser beam is introduced into the optical fibre.

Currently, optical signals have to be converted into electronic signals to be stored in computer memory. Recalling this information will require electronic signals to be reconverted to light pulses. These conversions use up lots of energy by generating heat.

Is it a big deal to store data for 10 nanoseconds? Daniel Gauthier, lead author of the paper, says it is, considering that light pulses do not last for longer than 1 billionth of a second. The researchers will have to work on storing data for longer intervals. "Only a few applications might find useful a technology with such short storage time. The next breakthrough will be when data is stored in seconds," says Gauthier.

Before that scientists will have to overcome an obstacle: even while storing data for 10 nanoseconds, the laser pulses required to generate and read data require about 100 watts of power, which is too high for a computer. The technology will develop faster if it finds applications. ■

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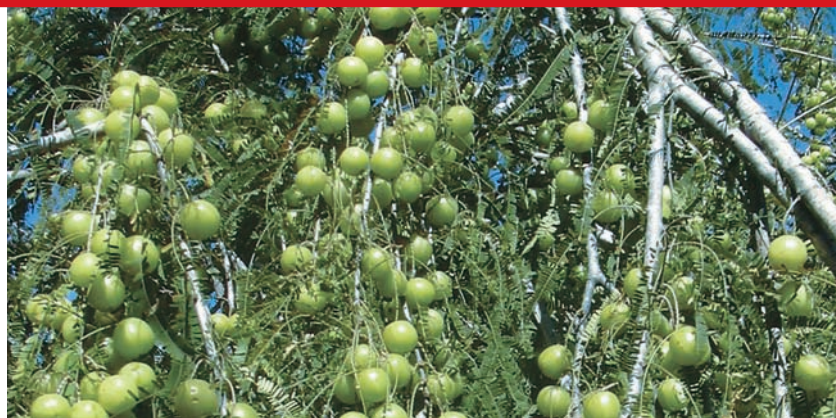
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HEALTH

Talk the walk

How pollution affects lungs

DOCTORS advise asthma patients against spending much time travelling. Now a London study has demonstrated how air pollution affects the functioning of the lungs in asthmatics in real-life conditions, not laboratories.

"For the first time we are able to measure exactly what's happening inside the lungs of people with asthma when they spend only a couple of hours strolling in a polluted area," said Fan Chung of the Centre in Allergic Mechanisms of Asthma at the Imperial College, London, who led the study.

Sixty people with moderate and mild asthma were asked to walk for two hours on Oxford Street where only diesel-powered buses and taxis run. The group was then asked to walk for the same period in a relatively cleaner Hyde Park.

The walk on Oxford Street induced asymptomatic but consistent reductions in the lung function. This was accompanied by increase in inflammation in the body. The study also revealed that the changes were associated with exposures to ultrafine particles and carbon, major components of exhaust.

Such measurements are important because they can help in assessing the effect of therapeutic strategies in asthma or other cardiorespiratory diseases, states the study published in the December 6 issue of *New England Journal of Medicine*. ■

BIODIVERSITY

Vanishing

Himalayan herbal heritage

ARCHITA BHATTA

TWELVE species of medicinal plants preferred by Uttarakhand villagers for their many uses are now rare and endangered, and one near threatened. These are the findings of a recent study by the National Medicinal Plants Board of India.

One reason is the forest department's bias for coniferous trees, which are not so useful to the villagers. Other reasons cited for this ebb—in the state famous for medicinal plants and biodiversity—include overextraction of these trees for trade and the failure of the research community to develop techniques to grow these species in controlled conditions. A detailed paper on this was published in the December 25 issue of *Current Science*.

It questions the science guiding India's afforestation schemes. Among

the 73 species preferred for medicinal use by the villagers of Chamoli, Pithoragarh and Pauri districts, only 17 per cent are included for plantation in the forest management plans. The study also points to the absence of consultation with the villagers in selection of plant species. This flies in the face of a government policy emphasizing this be done.

While the paper mentions—as do several other studies—that the forest department bears a part of the blame, Chandra Prakash Kala, lead author of the study, emphasizes that the biggest reason is that effective agro-techniques have not yet been developed to cultivate these species in nurseries. Research on such techniques began only a few years ago, and there are no results as yet.

Pushp Jain, a consultant on medicinal plants, points in a different direction: the forest department has promoted some local species, but the efforts failed due to indifference about the programmes and lack of independent monitoring. The danger, Jain says, is not from villagers' personal use but illegal harvest for trade to feed the growing ayurvedic industry. ■

PLUCKED OUT

NEAR THREATENED

- Pashanved (*B stracheyi*): treats blisters

ENDANGERED

- Chiraita (*S chiraiyita*): treats malaria
- Amla (*P emblica*): blood purifier; multi-purpose remedy
- Ateesh (*A heterophyllum*): treats diarrhoea; aphrodisiac

BYTES



POINT OF ORIGIN: The first humans on the North and South American continents came from eastern Siberia, not Asia and Polynesia as is believed. Researchers at the University of Michigan, USA, examined the DNAs of 29 populations of native North, Central and South American people to arrive at this conclusion. The results of the study were published online in *PLoS Genetics*.



WOBBLY TRANSGENIC: US and Taiwanese scientists have developed eucalyptus capable of ingesting three times more CO₂ than normal varieties. These trees also produce less lignin and more cellulose. Lignin interferes with efforts to turn the tree's cellulose into biofuels. Environmentalists say it involves a risk: lignin provides the tree structural stiffness and pest resistance.

“Nanotech control

We hear about nanotechnology everywhere but we seldom hear of its impacts. Is it good or bad?

We are just beginning to understand the nature and the extent of adverse effects that nanomaterials can cause. Nanomaterials, as the name suggests, are so small that they can easily pass through the cell wall. They are also capable of crossing the blood-brain barrier—a membrane in brain capillaries that normally doesn't allow any toxic particle in the bloodstream to enter into the brain.

Hence they represent a particular level of threat. But we are yet to know whether the technology is good or bad. I expect both. This will depend on its applications: whether its use as solar collectors and in medical applications will come up first or its indiscriminate commercial use in the cosmetics sector and household appliances will unleash some kind of tragedy.

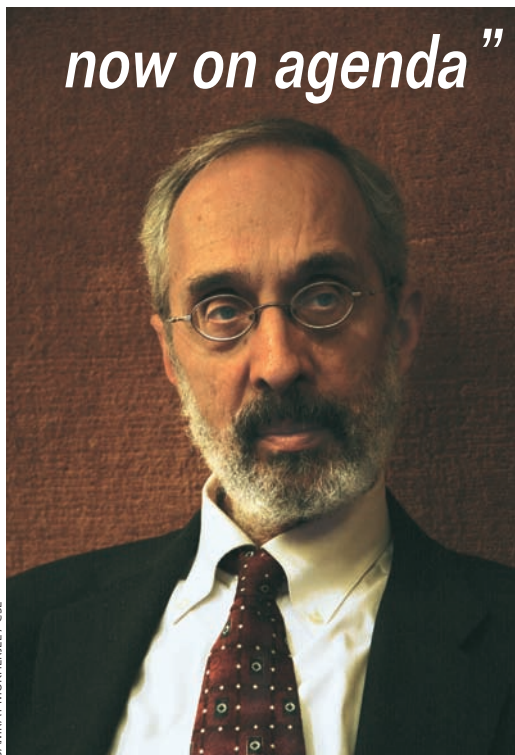
What nanotech products do we use in our daily lives? What are the possible dangers?

Currently there is a growing use of nanotechnology in the cosmetics sector. Earlier, sunscreen lotions used to look white when smeared on the face. But with nano-sized particles, the lotion looks clear after applying to skin. Cosmetics with such advantages are in huge demand in the market. About 400 cosmetics products across the world are based on nanotechnology and the US alone holds approximately 6,800 nanotechnology-related patents.

But, there are fears that such creams may penetrate our skin and enter the bloodstream. Despite this, there is no pre-market testing on the kinds of long-term damage that nanomaterials can cause, and the products are being introduced in the market indiscriminately.

The textile industry is also beginning to turn to nanotechnology for making fabrics that don't wrinkle. But these nanomaterials incorporated into the fabrics may get washed out and contaminate the environment. A leading company has come up with a washing machine that uses nano-silver. The

now on agenda”



SAMIRAT MUKHERJEE / CSE

BARRY CASTLEMAN, an environmental consultant and expert on workplace health hazards, tells **ARNAB**

PRATIM DUTTA about nanotechnology's impacts

company says it will help reduce smell while washing clothes. But nanomaterials will get flushed out with the wash water and pollute the environment. We are struggling to control the current level of water pollution. Imagine what will happen when the water also gets contaminated with nanomaterials.

Is there any study showing that nanomaterials can be hazardous?

Toxicological studies on nanomaterials such as carbon nanotubes have shown that when tested with animal experimentation, they can cause pulmonary fibrosis, even more rapidly and severely than asbestos does. Studies have also proved the harmful effect of nanomaterials on aquatic organisms.

Do nanomaterials affect people at the source?

People engaged in the manufacturing of nanotech products or working in labs where nanomaterials are handled may

have particularly high exposure, since these are the places where nanomaterials are constantly being used. Without necessary precautions, there might be tragic effects on workers.

Could this indiscriminate use of nanomaterials lead to increased cases of cancer in coming years?

We have no assurance. Carcinogenic effects of nanomaterials, if they occur, might take 20-30 years to manifest in humans. Even if tested on animals, it takes two-three years to get the results. Hence, anti-nanotech groups are calling for government regulatory control over the industry.

Is there any regulation governing nanotechnology?

At this point there is no regulation to govern nanotechnology. Europe has just begun talking about it. Some environmental groups such as the US-based Natural Resources Defense Council are lobbying for products to carry labels informing consumers that they contain nanoparticles, while

others are demanding more research on the health effects before they are introduced in the market.

Are developing countries at greater risk than the developed ones?

I think they are. Developed countries like the US have strict liability provisions. This means, a product seller is liable to any person who falls sick after using the product. If the product does not put any disclosure or warning on the label of the potential harm, then under the law it is regarded as unreasonably dangerous and the product seller is responsible for the medical costs, lost earnings and additional pain and suffering, leading to punitive damages.

This is unlike developing countries where such liabilities are relatively low or non-existent. National differences in public awareness, regulation and liability are now leading to a preferential drift for the hazardous industry to the third world. ■

Flush and forget

IIT Kanpur develops zero-waste toilets that reuse flushed water and recycle waste

SAVVY SOUMYA MISRA *Kanpur*

Soon it will be possible to have flush toilets with minimal wastage of water. The environmental engineering department of IIT Kanpur has developed a toilet that will reuse the water that goes into flushing rather than discharging it along with the excreta. This will be possible by not allowing water and solid waste to mix. So recycling water will be easy.

Everyone is talking of sewage economy and dry sanitation. But no one has yet come up with a proper alternative to dry sanitation. The most feasible

is guided into pipes in the sides that take it to another tank. The separation, says Tare, is close to 99 per cent.

The pipes are fitted with microfilters made of high quality poly vinyl chloride which clean the liquid. The microfilters do not cost more than Rs 100 and last at least a year. Smell traps fitted in pipes and tanks ensure that the toilet does not stink, says Pranveer Satvat, professor, Vellore Institute of Technology, an ex-student of Tare who had worked on the project.

While the collected solid waste is used for making compost, the filtered water is pumped back into the overhead

solve the problem of discharging waste water," adds Tare.

Although it is not necessary to make the flushed water pathogen-free since it will not come in contact with humans, the team of engineers is working towards environment-friendly methods of doing so.

Solid treatment

The tank containing solid waste will have exit points that could be connected to pipes. The solid waste can be sucked out and transferred into containers or trolleys. In the railways, once the train moves into the yard, pipes could be

Reusing flushed water is made possible by not allowing water to mix with solid waste. The water is collected separately, filtered and pumped back to the overhead tank

alternative is not to use fresh water in toilets because it does not matter what kind of water is used for flushing, says Vinod Tare, the brain behind the toilet. "This will bring down fresh-water consumption to a large extent, considering that each flush consumes 5-10 litres of water."

Indian Railways has approved the design developed by Tare and his students. "We are going to experiment with the toilet first on a Chennai-Thiruvananthapuram train," says Tare. UNICEF has also approached IIT Kanpur for using its innovation for community toilets. A trial run for this is on at IIT Kanpur and a public launch is likely in early 2008 at Aligarh.

The mechanism

When these toilets are flushed the vortex movement of water cleans the pan surface and pushes the solid waste downwards into a tank at the centre. While the centrifugal force—acting outwards from a centre of rotation—presses water to the surface of the pan, the geometric design of the surface guides it through a circular path downwards towards the separator. At the separator, the water

is guided into pipes in the sides that take it to another tank. The separation, says Tare, is close to 99 per cent.

After five-six days the tank will be refilled and the waste water—mostly urine, which is rich in nitrogen, potassium and phosphorus—can be evaporated to recover fertilizer. "Thus we

attached to these exit points and the tanks emptied.

The trolleys will dump the waste into a unit identical to a concrete mixer, which will already have some compost in it. Once it is mixed properly, it is dumped outside and allowed to decompose for sometime on its own. A week would be fine, says Tare. This pre-compost is further added to the fresh load of solid waste and the process repeated. After several cycles, the concentrated compost is processed by worms to make vermicompost.

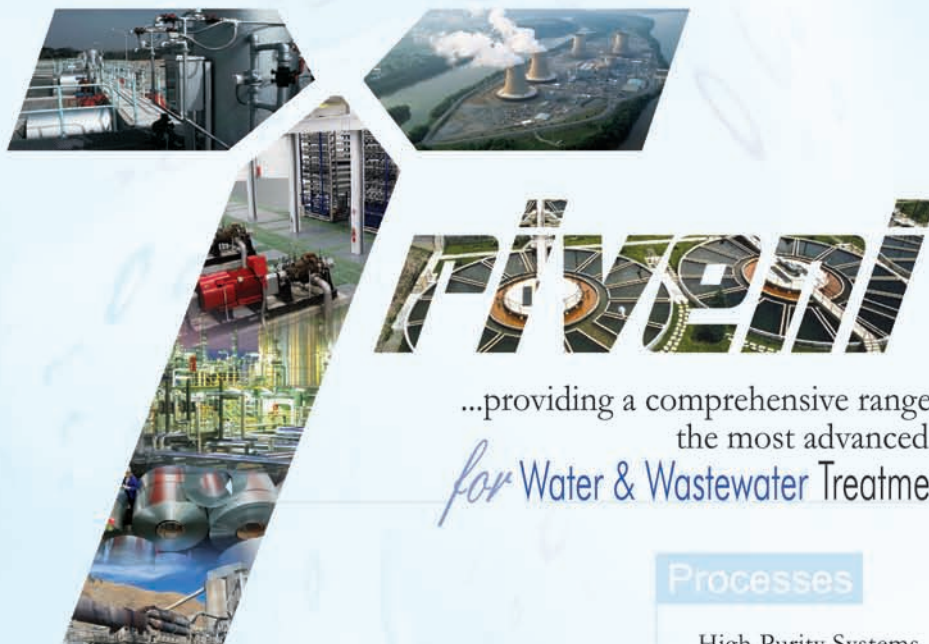
Tare explains that using faecal matter in vermicomposting is tricky. The compost currently being produced at the IIT campus, he claims, is of good quality and can be bought for Rs 10 a kg. The entire process of taking the solid waste out from the tank, into the trolleys and making the vermicompost will be done automatically.

These toilets are not only environment-friendly but also economic. A basic toilet will not cost more than Rs 5,000. IIT Kanpur is planning to set up six community toilets in Aligarh. The institute will oversee them for the first six months before UNICEF takes over. ■

Old looks, new technology: Toilet at IIT



SAVVY SOUMYA MISRA / CSE

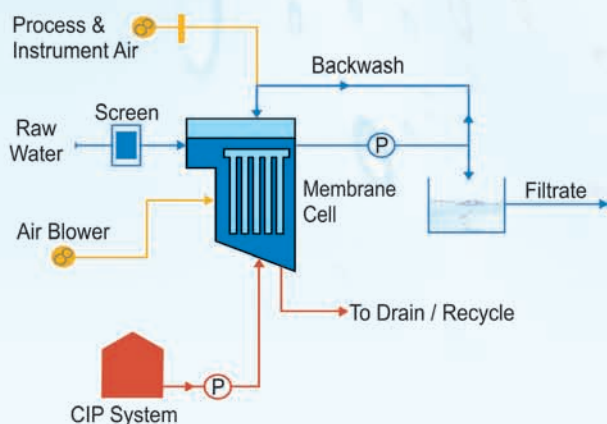


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Genocide revisited

January 2, 2006. At least 13 tribal people and a policeman were killed in a clash at the Kalinganagar steel complex in Orissa's Jajpur district. The tribal people were protesting the construction of a boundary wall for a proposed mega steel plant by Tata Steel when the violence broke out

The protestors retaliated by blocking the Daitari-Paradip express highway, considered an economic lifeline because it links the mineral-rich hinterland of Jajpur and Keonjhar districts with the Paradip port. The indiscriminate killings captured national attention and raised vexed questions on industrialization, land rights and rehabilitation. But rare in recent history was the prolonged outburst of tribal protest over the killings. Their protests sparked off a similar movement in Rourkela, Orissa on January 9, 2006, where 30,000 tribal people displaced in the 1950s by the Rourkela Steel Plant are yet to be rehabilitated.

On the first commemoration of the massacre, a monument was inaugurated: 13 simple stone pillars at the site where the dead were cremated. About 8,000 people, local and from elsewhere, demonstrated. Their demand: tribal people be given rights over mineral resources, land, water, forests and industry in tribal areas. The blockade of the highway went on for over 14 months before the district administration promised fulfilling some of the demands. Rabindra Jarika, secretary, Visthapan Virodhi Janmanch, the tribal organization spearheading the agitation, however, clarified that the tribal people would continue agitation against displacement. And they do. Twelve people were allegedly beaten up by security officials at the Kalinganagar industrial area on January 5, 2007, when they were demonstrating against the Jindal Steel Company for not giving local people preference in employment. Can violence keep them quiet? ■



We do not want to be displaced from our land. So long as we are alive we will continue our fight

CHAKARDHAR HAIBURU,
Resident, Chandia, Jajpur



PHOTOGRAPHS: SUNITA NARAIN / CSE



Signs of protest: (Clockwise from top) The boundary wall of the Tata steel plant that sparked off the protests two years ago; the site of the tribal-police clash; the fenced off area where the victims of the clash were cremated; the memorial



The protest by tribal people continues at Kalinganagar two years after the genocide



Opportunity time

A meet on small industries talks CDM

NIVIT KUMAR YADAV

If the invitation letter was anything to go by, the organizers of the International Conference on Micro, Small and Medium Enterprises seemed in dead earnest. The card quoted a World Bank report. "India has 4.5 million small and medium enterprises that contribute 40 per cent of the industrial production but create 70 per cent of the industrial pollution," it said. An international conference to look into pollution problems of small industrial units naturally raised expectations.

a.m. The programme list at first glance seemed assuring. The list of speakers did include some in the business of controlling pollution in the country. But then why were a majority of presentations about the small industry's CDM potential? Was I at the wrong place?

I read the invitation letter again, only to find the now-familiar lament on the indifference towards pollution by the small industry. There was absolutely nothing on carbon trading. And yes, I was at the right venue. Only there seemed to be no small-industry representatives. Or were they lost among the

two upbraiding NGOs for not helping this sector realize its potential.

But I decided to hold my horses. The next few speakers were from government agencies. Maybe they would say something about small industries. Sure they did. B Sengupta, member secretary, Central Pollution Control Board, talked on how his agency was trying to encourage sponge iron units to supply their charcoal to thermal power plants. There was some platitudes on the amount of pollution from this industry as well.

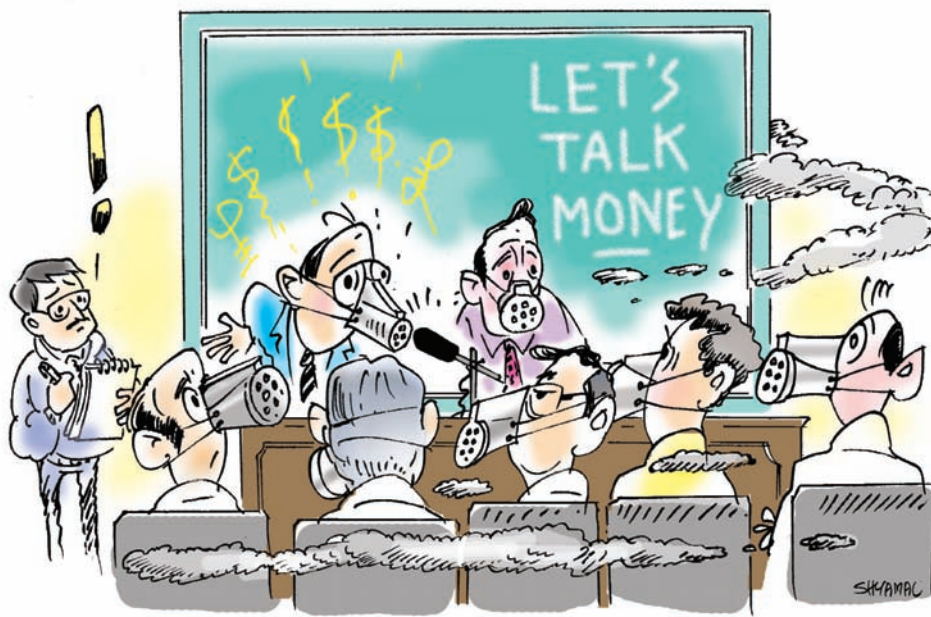
But then we were running behind schedule. The main business had to take precedence. B Datta, senior programme manager, and Sunil Kathuria, EcoSecurities India, offered their company's expertise on carbon trading. The small industries had only to pay the registration cost; EcoSecurities would take care of all other overheads, the company's representatives assured.

All this seemed a little too saccharine sweet. Not for long though. EcoSecurities representatives quickly came down to business: the company would take the carbon credits in lieu of its services.

Small industry was hardly there. Was I at the wrong place?

The presentation set the tone for the bankers. B S Prakash, consultant, Green Banking, State of Bank India, and Manoj Mittal, deputy general manager, Small Industries Development Corporation of India, held forth on how their institutions aid small industries. But they had very little to share except a few stray examples. Prosanta Pal, senior fellow, TERI, was similarly stingy on details: he talked of his organization developing some technology for small industries, but did not elaborate. Perhaps because we were running short of time.

Yes, I was at the wrong place. I had allowed myself to be led by the text on the invitation card. It had promised lunch as well. Was disappointing: I had to wait until the throng of international dignitaries had their fill. But then disappointment was the order of the day. ■



But I had herky-jerky premonitions—the ardent message on the card notwithstanding. To begin with, the venue, Hotel Intercontinental in Delhi, seemed a little too luxurious for a small industries' meet. It was perhaps chosen to fit the conference's international character, I assured myself. But then why was the Confederation of Indian Industry (CII) organizing the meet? Was this big industry cabal finally shedding its blinkers towards small industry?

Anyhow, I reached the venue on December 7 at the appointed time: 9.30

international dignitaries?

Before I could gather my thoughts, R K Jain, director, Eicher Limited, had begun waxing eloquent about the big industry's initiatives to control pollution. It was supposed to be a small industry meet, eh?

I was getting baffled big time. But then Jain did go on to talk about small industries. By the time he had finished his sermon, I was pleasantly educated on how the emerging carbon trading market was a big opportunity for small industry. There was also a statement or



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Announcement

Seminar on

Cancer Chemotherapy: Hopes, Disappointments and Preventions and

Lecture series on Pharmacology

(Seminar: 18th January, 2008

Lecture series: 21st January – 8th February, 2008)

Gupta College of Technological Sciences, a college of pharmacy, Asansol-1, West Bengal, announces the deliberation of an on-campus lecture series on pharmacology by **Dr Ward Kirlin, Associate Professor in Pharmacology, Morehouse School of Medicine, Atlanta, GA, USA** between 21st of Jan - 8th of Feb, 2008. The inauguration ceremony scheduled on the 18th of January, 2008, will be chaired by **Dr. Ashok Ranjan Thakur**, Vice-Chancellor, West Bengal University of Technology and will be followed by a seminar talk by Dr. Ward G. Kirlin on Cancer Chemotherapy: Hopes, Disappointments and Preventions. This will provide an account on the recent advances in drug treatments for cancer and epidemiological evidence of the benefits of vegetables and fruits in cancer prevention.

The lecture series starting from 21st of January through 8th of February 2008, will include various topics in pharmacology as per the syllabus of Master degree Pharmacology, W.B.U.T. For further details, contact Dr. Anamika Sengupta, Assistant Professor, Gupta College of Technological Sciences, Asansol-1 West Bengal, e-mail: anamika_sengupta@yahoo.com, phone no. 03412213120. Interested persons are welcome to attend the lecture series with advanced notification to the organizers.

Why the conflict

A lot of misinformation characterizes the recent tiger debate



SANJAY UPADHYAY

The notification of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (forest rights act) and rules brings a long process to close. But the real challenge is now. There are two extreme positions on the act. One holds that historical injustice has been done to forest dwellers, especially during the forest reservation processes of the last century, while the other believes that the last forest tracts will be handed over to people who cannot coexist with wildlife, especially tigers. The government has swung from one extreme to another: it drew up the first draft act in 14 days in early 2005 but took almost two years to notify the act.

The debate so far has been unclear on several issues, including the total

states that the act's aim is to recognize forest rights for those who have been residing in forests for generations but whose rights could not be recorded. Such rights are based on a well-established global principle: security of tenure is cardinal to ensure effective conservation. Laws in the Philippines, Australia and in many African countries follow this principle. The Union Ministry of Environment and Forests too recognizes insecurity of tenure and disputes in land titles and forest lands as major impediments in effective forest management and has even issued directions to correct these anomalies.

But several myths persist. It is held that the act will hand over 4 hectares (ha) of forest land to every tribal family. Actually, the legislation only recognizes *existing occupation* up to a maximum of 4 ha. This has to be validated at a three-level scrutiny process where the forest, tribal, revenue and panchayat departments would be involved in verifying the veracity of claims.

Another serious concern is about the magical figure of 4 ha. For those who have followed this law it seems a com-

promise between the 2.5 hectares envisaged earlier on the basis of existing Forest Village Rules and the "as is where is basis" advocated by the Joint Parliamentary Committee. There is no scientific or legal basis to 4 ha.

The December 13, 2005, cut-off date for recognizing occupancy is also beyond reason. The act was about undoing historical injustice, which has to be proved by historical records. December 13, 2005 is not a historical date. Also, a cut-off date hints at regularizing encroachment. But this act is not about such regularization; it's about recording unrecorded rights. Conservation-oriented rules also have due processes for bona-fide claimants, which have been rightly criticized as faulty. The forest rights act only attempts to better existing processes.

The tiger lobby claims that the act will transfer several thousand hectares to tribals and grant them land ownership on forests. But the act does not mention ownership (except for minor forest produce). It only secures the tenure and usufructs of those who have resided on forestlands for generations.

The biggest challenge, however, is the determination of "critical wildlife habitat". The rules completely ignore how this important aspect of the act will be secured. Many say the *gram sabhas*, the lowest unit of governance, cannot be given the important task of initiating

Forest rights act will only secure tenure on forestland. It does not transfer ownership. Don't we feel insecure without papers in our own homes?

area of land to be transferred, ownership, process of recognition, cut-off date, duties and scope of the act. The recently notified rules have not made things easier. The reliance on *gram sabha* of the conventional *gram* panchayat, lack of clarity on protection methods, the introduction of the panchayat secretary in the initiation of recognition process, lack of linkage with existing participatory forest management strategies, inadequate process of defining community forest resources, the silence on "critical wildlife habitat", and the lack of representation of civil society in the recognition process are some of the things which make matters complex.

The solution is to go back to the essence of the law, the preamble. It



SAMRAT MUKHERJEE / CSE

the recognition process because they lack capacity. In fact, the rules dilute the original plan of starting the recognizing process from the hamlets.

Why are we reluctant to rely on the wisdom of ordinary *gram*? Who conserves forests? Aren't the daily wagers involved in forestry, the guides, informers, knowledge holders on forest, the village boy who shows tigers to urban enthusiasts, members of the same forest dwelling communities? This act is about their security of tenure. It's time to clear myths, reconcile differences, before we lose both the tiger and the tribal. ■

Sanjay Upadhyay is member, Technical Support Group for framing the Rules for the Forest Rights Act and a supreme court advocate

A pyrrhic victory

The Niyamgiri verdict is not about protecting forests



MADHU SARIN

On November 23, the Supreme Court of India refused to permit Vedanta Alumina Limited to mine bauxite in the Niyamgiri hills. Many have interpreted it as a blanket refusal to mining in the hills. Nothing could be further from the truth. The judges have only attempted to protect themselves from being charged with permitting mining by a company black-listed by the ethics committee of the Norwegian government for environmental and human-rights violations.

While saying no to Vedanta, they have happily empowered themselves to invite Sterlite, a part of the Vedanta group and severely indicted by the Norwegian ethics committee, to apply for mining in Niyamgiri. One would have thought that judges would know that it is not their business to invite a company, which was not even a party to the case, to submit a fresh mining proposal. Ironically, one of the charges against the Orissa government's mining lease to Vedanta was that it was not allocated through a transparent process of competitive bidding.

Many also believe that the ostensible saving of Niyamgiri was due to the Forest Conservation Act (FCA) 1980, and the Wildlife Protection Act (WPA) 1972. This is delusion. FCA only centralizes the power for diverting forestland in the Forest Advisory Committee (FAC) constituted by the Union Ministry of Environment and Forests. FAC pressured the Wildlife Institute of India to change its report against mining Niyamgiri and

gave forest clearance at super speed. Given the rate at which FAC is giving forest clearances to most destructive projects, it's a delusion to believe that

FCA provides effective protection to ecological and mineral-rich forests like Niyamgiri. The Central Empowered Committee that advises the supreme court on forest-related matters has recently criticized FAC for its magnanimity in sanctioning forest diversion. This should remove all doubts about the FCA's effectiveness in conserving forests.

WPA has been no less ineffective. Niyamgiri's working plan had recommended notifying the area as a wildlife sanctuary and efforts were made to protect the hills under WPA. The fact that Niyamgiri had been approved as an elephant reserve cut no ice with the environment ministry, Orissa govern-

ment or the supreme court bench. Moreover, those deluding themselves with the belief that FCA and WPA will protect forests and wildlife should read the bizarre report of the environment ministry supporting mining in Niyamgiri. The report says mining will not disturb wildlife, improve forest cover,

benefit tribals (when they are screaming against devastation of their sacred hill) and improve water flows due to increased seepage from the cracked sides of the mountain due to blasting. Going by this logic, we should subject all our mountains and hills to blasting.

Authorities invoke FCA and WPA primarily to dispossess the marginalized. The forest rights act (FRA) 2006 originated to protect such people from such unbalanced use of the law. It could have provided better grounds to stop mining in Niyamgiri by devolving the decision-making authority to the local tribal



SHYAMAL

community. In fact, on October 5, an independent writ petition was filed seeking protection of the Niyamgiri hills as the customary forest resource of the Dongria Kondh tribals residing near it under FRA. Had the bench given an opportunity to the petitioner's lawyer to present his arguments, FRA would have provided strong grounds for the tribals demanding protection of their sacred hill. Shockingly, the 'learned' judges not only refused to hear the senior advocate but one of them humiliated him in open court while another admitted that he owned Sterlite shares. This is one of the rare times that hearing was concluded without actually hearing the primary stakeholders, the Dongria Kondhs.

This could have been the first case where FRA would have empowered local tribals to assert their right to protect their ecological resources. On the contrary, the judgement says the judges cannot 'risk' handing over an important 'asset' (whose?) to a company which might backtrack from its agreement. They have invited its subsidiary Sterlite to mine Niyamgiri subject to its accepting a complex monetary deal, including a commitment to undertake 'tribal development', while refusing to hear the tribals' viewpoint—when Niyamgiri is in a Schedule V area where, under the Constitution, the tribals should have authority over their local resources. ■

Madhu Sarin works on democratic decentralization of natural resource management



BOOK >> *THE REVENGE OF GAIA* • by James Lovelock • Allen Lane, London • 2006

A reluctant icon

PRATUL RATURI

This is an extremely unsettling work. James Lovelock, maverick British scientist, argues here that global warming has passed the point of no return.

Lovelock is renowned for the development, with biologist Lynn Margulis, in the early 1970s of the idea of “the dynamical physiological system that has kept our planet fit for life for more than three billion years”. Following a conversation with the novelist William Golding, Lovelock named this self-regulating system after the Greek earth goddess, Gaia. According to the Gaia theory, life on our planet unconsciously acts in concert to regulate Earth’s climate.

The theory elicited a firestorm of

In *The Revenge of Gaia*, Lovelock applies the theory to climate change. Using the latest scientific findings, he concludes that global heating—as he describes it—is set to take its course. “We are the cause of it, and nothing so severe has happened since the start of the Eocene, 55 million years ago, when the change was larger than that between the ice age and the 19th century.”

The gloomy theory

In advancing this theory, far gloomier than any yet made by a scientist of comparable international standing, Lovelock accepts he is going out on a limb. But he feels his own analysis leaves him no choice.

He believes that it is the self-regulating mechanism of Gaia itself will ensure

sustainable technologies and alternative sources of energy can somehow smoothly replace the looming negative consequences of global warming.

He sees these as akin to false assurances of politicians, designed to make people living in the luxury and comfort of the First World, making them live in false security when they should be terrified instead.

The scientist believes we must retreat from our profligate energy usage, going so far as to use an analogy from history: Napoleon’s Russia campaign, which also might have benefited from a planned retreat.

But Lovelock is also mindful that the billions of people cannot go back to pre-industrial days. The scientist’s advocacy of nuclear energy as a tentative solution is also not likely to be palatable to environmentalists. He is careful to qualify his support with many caveats. Fusion, which is not currently a viable technology, is preferable to fission, which is viable, but carries a greater waste problem.

The Revenge of Gaia is a slim volume that can be easily read in one sitting, but

James Lovelock’s argument that sustainable energy offers little hope against climate change won’t please environmentalists who idolize him

criticism, much of it from Darwinians. A lot of it was because of misinformation: many thought Lovelock had described the earth as a living organism. A lot of the cynicism was confirmed when ecological romantics of the 1980s adopted Gaia as a kind of faith.

Lovelock had to clarify matters. A better analogy for Gaia is that of a giant self-regulating valve, like those used by engineers to control machine outputs. Used this way, the idea went on to help scientists sharpen their predictive powers, particularly over climate change.

But the theory was not all about metaphors. Proving that the atmosphere and oceans were the critical components of a self-regulating system was an exercise in cause-and-effect evidence gathering.

Identifying the chemical transactions that regulated the planet’s climate became Lovelock’s calling. Today the Gaia theory is mainstream—though a lot of scientists prefer to call the theory the earth system.

that the warming cannot be mastered. This is because the system contains myriad feedback mechanisms, which in the past have acted in concert to keep the Earth much cooler than it otherwise would be.

Now, however, they will come together to increase the warming being caused by human activities such as transport and industry through huge emissions of greenhouse gases.

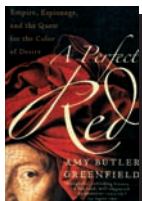
So Lovelock calls on governments to begin large-scale preparations for surviving what he now sees as inevitable, in his own phrase, “a hell of a climate”.

Lovelock’s arguments are not likely to be palatable to many environmentalists—a lot of them in fact regard him as an icon. He argues that it is naïve to believe that

it raises many significant questions and offers a perspective on planetary health that is not likely to be found elsewhere. Though the book has been occasioned by the scientist’s pessimism that we may have already passed a planetary tipping point regarding global heating, many of us will do well see the folly of our profligate ways. But will there be any corrective action? ■



SHYAMAL



BOOK >> **A PERFECT RED: EMPIRE, ESPIONAGE, AND THE QUEST FOR THE COLOR OF DESIRE** • by Amy Butler Greenfield, HarperCollins, New York • 2006

Fragile little insect



The words “crimson” and “vermillion” carried connotations of churchly authority in medieval times. Both words denoting a shade of scarlet have a root meaning of “worm”. Cochineal, the red dye brought by Spaniards from Mexico to Europe, takes its name from a common Spanish euphemism for wood lice, *cochinilla*.

Cochineal comes from a fragile insect that lives on prickly pear cactus. “Pinch a female cochineal insect,” Amy Butler Greenfield writes in this book under review, “and blood-red dye pours out.” Apply the dye to mordant cloth, and the fabric will remain red for centuries. Greenfield’s book is a fascinating social history of dyeing, focusing on the intrigues around different shades of red, the most vibrant of which were reserved for royalty.

Until coal-tar synthetic dyes were discovered in the 19th century, the rich red colours of blood and power were obtained from various insects of the scale family, or from murex and purpura shellfish. Rare and difficult to gather, these dye materials were expensive. If you could afford red ribbons, you were well-to-do. The truly wealthy had entire garments in various shades of red.

When the Spanish conquistador Hernán Cortéz invaded Mexico, he found that the emperor, Montezuma, claimed the right to wear the most brilliant red and imposed on his subjects a

tax to be paid in cochineal insects, from which the vibrant dye came.

European intrigues

The Spanish quickly monopolized the world’s supply of cochineal; in 1587 alone, they shipped 65 tonnes to Europe. Even so, cochineal insects were finicky about climate, and it took 70,000 dried insects to produce one pound of red dye. The more European monarchs and gentry wore the succulent hue, the more prominently cochineal figured in society.

When Napoleon swept into Spain in the 18th century, he hoped to stamp French supremacy over the cochineal trade. But famine in Mexico, and the increasing ascendancy of British sea power, prevented him from realizing that profit. Mexico’s hard-won independence from Spain might have signalled the rebirth of the cochineal industry, its monopoly in different hands, except for one significant development. The insect had escaped the country’s borders.

Greenfield’s is a superbly researched history full of anecdotes, curios and arcana. *The Perfect Red* may remind a lot of readers about Mark Kurlansky’s classic *Salt: A World History*, particularly in the way it traces the far-reaching impact of a single commodity. Some anecdotes bog down the story, but most are sprightly and charming. ■

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CAMPAIGN>> SOFT DRINK • India



INTERNET>> BROWSER • Global

Adieu netscape

The browser that helped kick-start the commercial web is to cease development because of lack of users. The software major AOL, which owns the browser now, will cease supporting after February 1. Users will not receive security or software updates after that date.

In the mid-1990s, the browser was used by more than 90 per cent surfers, but numbers have slipped to just 0.6 per cent with web users now preferring Microsoft's Internet Explorer and Mozilla Firefox. "While internal groups within AOL have invested a great deal of time and energy in attempting to revive Netscape, these efforts have not been successful in gaining market share from Internet Explorer," AOL's representative Tom Drapeau said.

The demise of Navigator was hastened in 2003 when AOL, which bought Netscape in 1998, made redundant most of the staff working on new versions of the browser. Many of the staff moved to the Mozilla Foundation which develops the popular Firefox browser. "We feel it's the right time to end development of Netscape branded browsers, hand the reins fully to Mozilla and encourage Netscape users to adopt Firefox," Drapeau said. ■

The flab about fizz

Consumer rights groups in the country have come out against surreptitious advertising by cola companies. Sixty such organizations have come together to constitute the Indian chapter of the Global Dump Soft Drinks Campaign, which demands that governments curb advertising of sugar-rich beverages, especially those targeting children under 16.

The campaign was launched in India on December 24, the National Consumer Day, and is part of a worldwide programme spearheaded by the Washington Center for Science in the Public Interest and the International Association of Consumer Food Organizations. It's a pertinent one with soft drink majors bragging about their iconic status with the young. There is some justification to their actions, for

sure: with sportspersons and film stars endorsing their products, colas do have their way with the young. Sponsoring sporting events is a key element of this catch-them-young strategy.

Among the campaign's demands is that the government check such marketing. As an alternative, the campaigners suggest that sponsorships promoting physical activities be limited to "contributions to blind trusts" overseen by government. They also demand that soft drinks have mandatory labels with the alert: "For occasional consumption. Drink water to quench thirst." These demands are consistent with the World Health Organization's Global Strategy on Diet, Physical Activity, and Health.

More information about the campaign is available at www.dump-soda.org. ■

REPORT>> PRESS FREEDOM • South Asia

Hard times

The South Asia Media Commission has declared 2007 a very difficult year for South Asian journalists. The year saw 25 journalists and media workers getting killed in the line of duty. Besides, the media had to face "unprecedented restrictions and forced closures" in Pakistan, Sri Lanka and Afghanistan.

The report, released on December 31 found that barring Bhutan, no other SAARC country had been free of attacks on the press. Pakistan

topped the list with seven journalists killed.

Sri Lanka came a close second with six deaths, Afghanistan third with a death toll of five journalists, and Nepal fourth with a tally of three. Besides, a media worker was killed in Afghanistan and three lost their lives in India.

In India, the Commission noticed disturbing trends: "Arrogance by the authorities, especially in the states; misplaced enthusiasm to 'reform' the media, and intolerance of militant groups, evident in disproportionate, violent reaction to publication of the accounts of their activities not to their liking." ■



NEWS SNIPPETS

>> Smoking has been banned in restaurants and cafes in France and Germany. Eight German states have ushered in 2008 declaring their pubs and restaurants smoke-free. The new ban is seen as a big cultural shift for France, where smoky cafes have long been the haunts of famous artists and philosophers.

>> Egypt is planning to pass a law that would exact royalty payments from anyone found making copies of the country's ancient monuments or museum pieces, including the pyramids. Zahi Hawass, head of Egypt's Supreme Council of Antiquities, said his country would use the money raised to pay for the upkeep of its prestigious sites.

SATELLITE DISH>>> PRICE RISE •
Myanmar

Crackdown

Myanmar's military junta has dramatically raised the annual fee for TV satellite dishes, an apparent move to block the foreign news channels that beamed in global criticism of its recent crackdown on pro-democracy protests.

An official at Myanmar Post and Telecom, the country's regulatory authority, confirmed as much. He said it was meant to discourage people from watching foreign news channels. The license fee has rocketed from US \$5 to US \$800—an unaffordable sum to most people in Myanmar. It is equivalent to about three times the annual salary of a

public school teacher. The new fee was imposed without warning.

"The government is trying to shut our ears and eyes," said Thant Zin, a civil servant. Some residents said they would be forced to give up satellite TV, while others said they would risk fines and secretly keep their dishes in place. ■



HOTLINE>>> AIDS • Egypt

Foreign problem

In a small room, in a modest, but well-maintained building in Central Cairo, a phone rings. The caller, a woman, suspects that her husband has been having sex with someone else. She is concerned that she might be at risk of catching HIV. The call that lasts no more than five minutes is not unusual on Egypt's national HIV/Aids hotline.

Supported by UNICEF, the hotline provides information on HIV to callers in

Egypt and other North African countries. The disease is still widely seen as a "foreign" problem, nothing for ordinary Egyptians to worry about. But a number of factors—including lack of basic information about the virus and an increase in the number of young people engaging in premarital sex—have prompted concerns that the situation could quickly worsen.

"Our callers phone us with varied concerns," says Ahmad Bahaa, the hotline manager, whose centre receives some 15 to 20 calls a day. "We receive a lot of calls about modes of transmission, about symptoms, though, even now, a lot of callers hang up because they are afraid that we might be tracking them which, we are not, of course," he adds. ■

GREETING CARDS>>> RECYCLING •
Australia

Happy recycling

The environmental group Planet Ark is urging Australians to recycle their Christmas and New Year cards. This is the group's 14th year of card recycling and Australia's postal department has joined in the endeavour. It has distributed one million free envelopes that people can use to post their old cards to Planet Ark.



ONLINE

www.greenbuildings.com

HOW GREEN IS YOUR HOME?

Buildings, both in design and choice of materials, have significant impacts on environment. Much of the concern boils down to the use of energy. How much is used in transporting building material? Once the house is built, how much energy does it consume to keep its inhabitants comfortable? Consumption of energy has a direct influence on environmental quality, because of pollution through greenhouse gases and other emissions. Then there is the loss of natural beauty, ecosystems and basic resources associated with the extraction of fossil fuels and building materials.

www.greenbuildings.com has links to sites that provide information on houses that require very little energy to keep them comfortable. The links under the head, 'Sustainable Architecture' outline a dozen points to keep in mind when designing a sustainable house.

Examining the architecture of diverse cultures can provide many ideas for beauty, energy efficiency and appropriate use of materials. The site has an extensive gallery of posters and art prints depicting architecture from around the world that can help evaluate various styles.

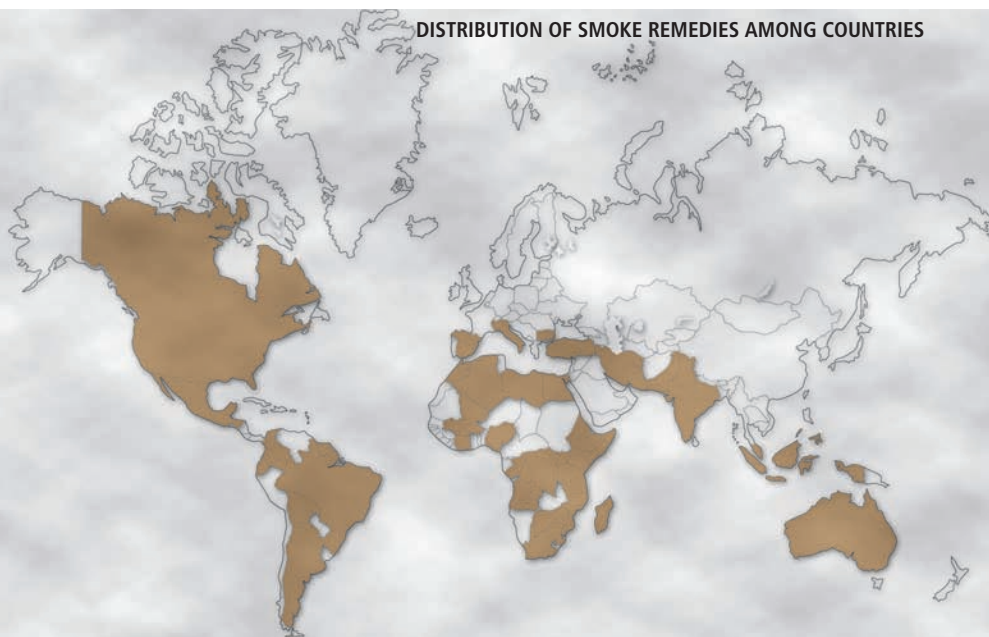
The site provides a way to communicate with, and learn from, a variety of experts in the many fields associated with the site. In the 'Ask the Experts' section, you are invited to ask questions and read the responses to others' questions. There are sections about building codes, financial aspects and also a store where pertinent media can be purchased.

"After people have put their unwanted greeting cards inside those envelopes, all they have to do is post them and Planet Ark will ensure that they get mashed and pulped and then turned into a range of paper based products," the group's founder and chairman, Jon Dee, said.

"The message from Planet Ark is we want people to recycle as many of their greeting cards as possible. People can also send in birthday cards, get well cards, Hanukkah cards, in fact any card they received at other times of the year," he added. ■

Smoke for thought

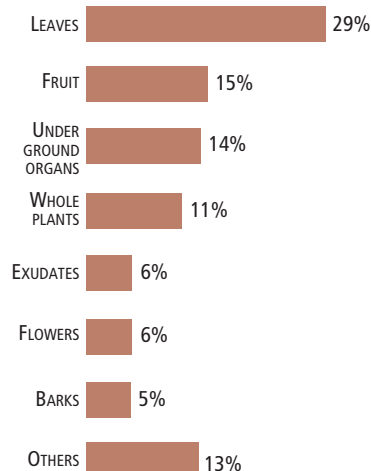
Going against the current scientific grain, four Iranian scientists reviewed literature from more than 50 countries across the world and found that smoke has several therapeutic uses



MULTI-INGREDIENTS REMEDIES THAT ARE USED IN THE SMOKE FORM

REMEDY (REFERENCE)	INGREDIENTS NAME/SCIENTIFIC NAME (FAMILY)	COMMON NAME
Zagho Esfand: an Iranian antiseptic remedy	Boswellia glabra Roxb. Ex Colebr. (Burseraceae) Peganum harmala L. (Zygophyllaceae) Alum	Kundur Esfand Zaj
A remedy used by South Africans to heal headache	Rhus leptodictya Diels (Anacardiaceae) Tabernaemontana elegans Stapf (Apocynaceae) Elephant dung Two unidentified plants	Mushakaladza Mahatu Mashibanduhu

PERCENTAGES OF PLANT PARTS USED AS MEDICINAL SMOKE, GLOBALLY



MONO-INGREDIENT HERBAL REMEDIES REPORTED FOR USE AS MEDICINAL SMOKE

FAMILY/SCIENTIFIC NAME	ORIGIN: COMMON NAME	MEDICINAL USE
Cannabis sativa L.	Guyana: Cannabisc; Nepal:Bhango;	Narcotic, analgesic, mood disorders
Capparaceae Capparis tomentosa Lam.	Somalia: Liimo-daanyeer	Respiratory tract diseases

MONO-INGREDIENT NON-HERBAL REMEDIES USED AS MEDICINAL SMOKES

NAME (ENGLISH)	LOCAL NAME	CLAIMED MEDICINAL USE(S) AND MALADY(IES)
Butter	Iran: Kareh	Analgesic
Dung	Iran: Pehen	Repellent

METHODS FOR PRODUCING AND APPLYING MEDICINAL SMOKE

1. Smoke inhalation
2. Smoke directed at a specific organ or body part
3. Ambient smoke

Source: Abdolali Mohagheghzadeh et al, 'Review Medicinal Smokes,' Journal of Ethnopharmacology 108 (2006) 161-184



Rich Lands Poor People is the sixth Citizen's Report on the State of India's Environment. It follows a tradition of analysis based on empirical research. We are not being sentimental when we ask, as the book's sub-title does:

Is sustainable mining possible?

compound annual growth rate of India's mining industry, 1993-2005

10.7 %

value of mineral production in India, 2005-2006 (up from about Rs 25,000 crore in 1993-1994 up from about Rs 25,000 crore in 1993-1994)

Rs 84,211 crore

number of people displaced by mining projects, 1950-1991 of these, 52 per cent are tribals. There are no statistics, after 1991, on the number of people displaced due to mining projects

25.5 lakh

forest land diverted for mining in India, 1980 onwards

164,610 hectares

water consumed to extract iron ore in India in 2005-06, enough to meet the daily water needs of more than three million people.

77 million tonnes

abandoned mines in Orissa that are called 'orphaned'; they are so called because the miners simply dug and ran, leaving a pit and piles of waste

73 %

waste generated in mining only the major minerals in India, 2006

1.84 billion tonnes

mining's contribution to the nation's Gross Domestic Product in the last 10 years

2.2-2.5 %

number of people Indian mines employed to produce Rs 1 crore worth of minerals i2003 - 2004

18

number of conflicts between miners and local populations, recorded merely in the English language media, in just 2006-2007

78

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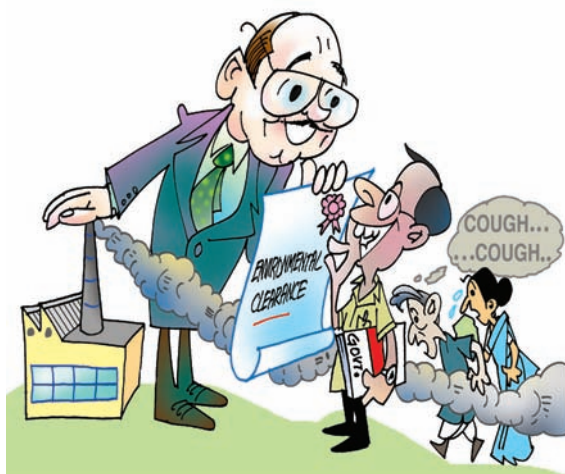
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 - Tools and thumb rules available to evaluate the environmental impact of projects
2. Better understanding of the EIA process – from screening, scoping, data collection to impact assessment as well as the role of public consultation
3. Better understanding of the environmental and social impacts of the industrial and developmental projects
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Online registration: <http://www.cseindia.org/aagc/eia.htm>



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