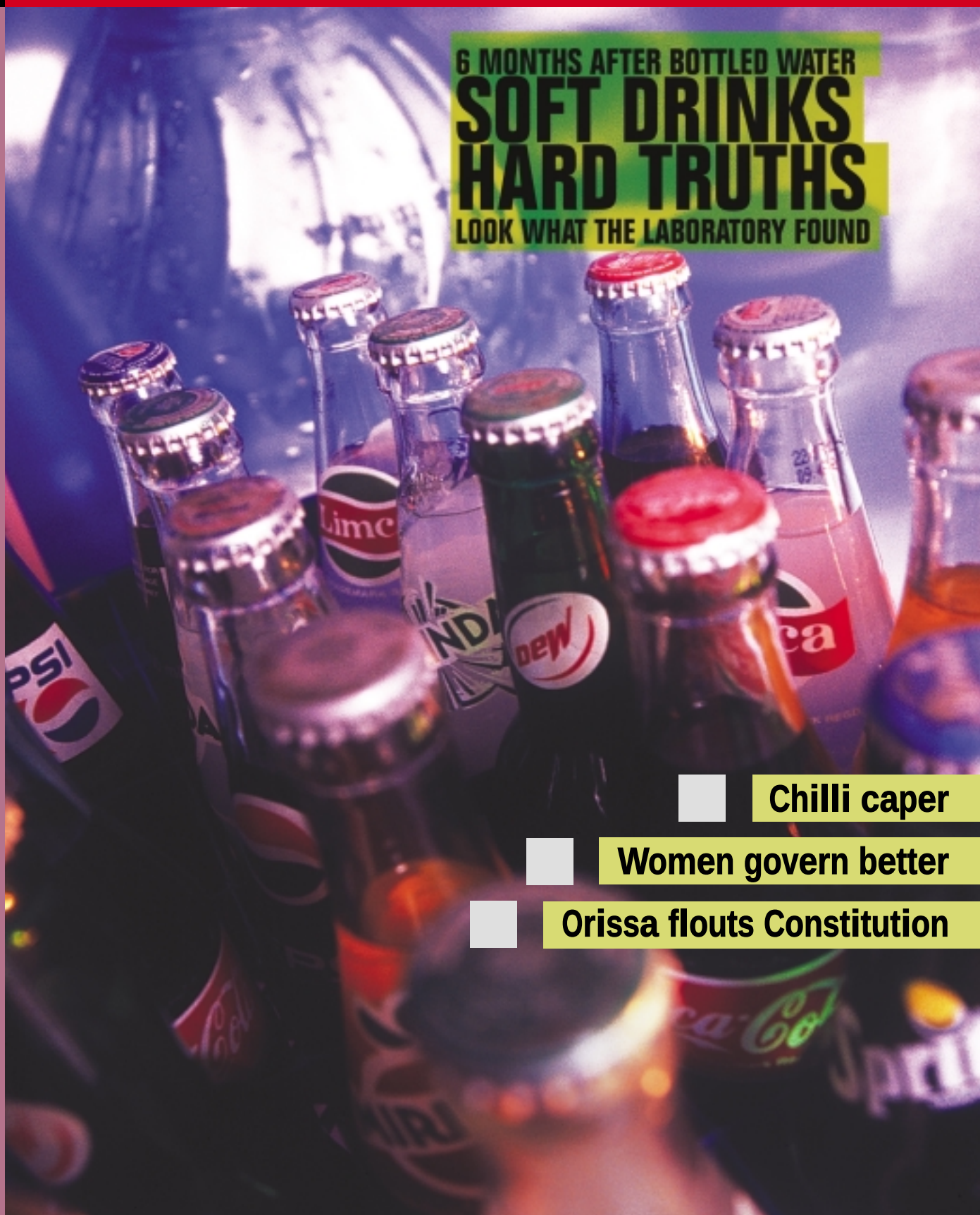


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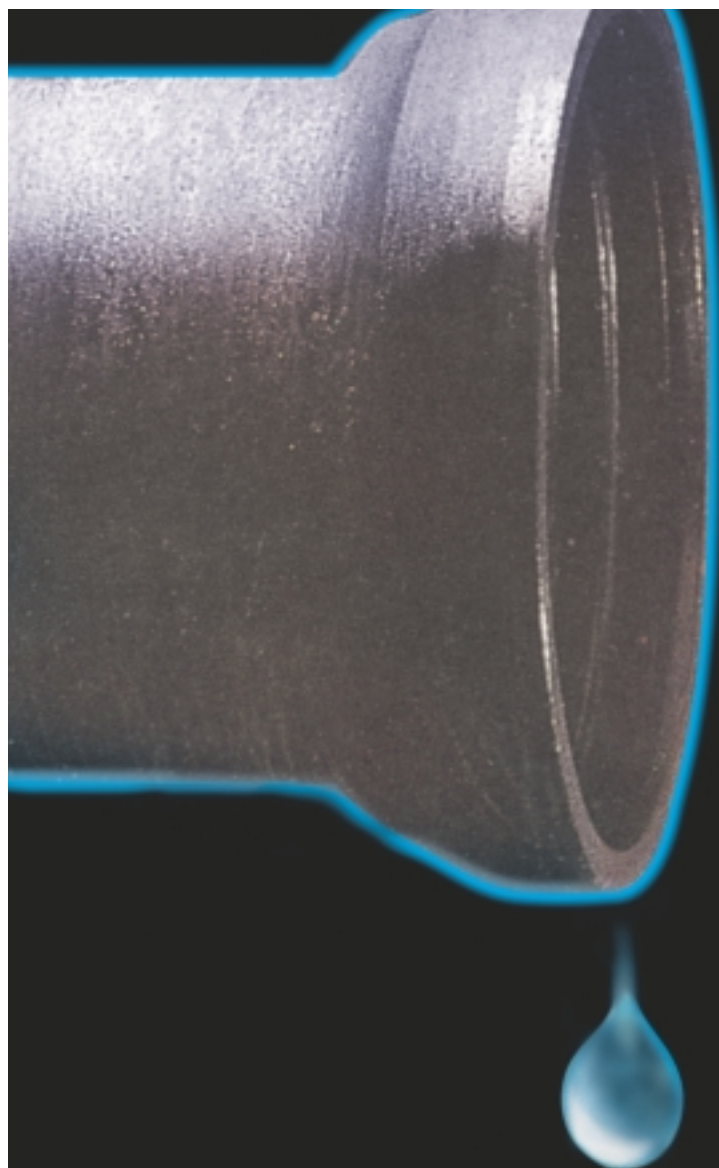
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COVER PHOTO: SURYA SEN

All about arsenic

This is in response to the cover story 'The Dark Zone', (*Down To Earth*, Vol 11 No 22, April 15, 2003). I compliment you for the incisive write-up on arsenic and fluoride pollution in groundwater in India. However, *Down To Earth* readers are misinformed about several aspects of arsenic pollution.

It is reported that "arsenopyrite has been primarily identified as the main source of arsenic pollution in Bangladesh". Arsenopyrite-bearing layers in the alluvial aquifer get oxidised due to draw down of the water table induced by heavy irrigation related pumping, and thereby releasing arsenic into the groundwater. But these theories are far from the truth. In 1999, we reported in the journal *Nature* and in the September 2000 edition of *Environmental Geology*, that pyrite, arsenopyrite or any other arsenic-bearing mineral are absent or rare in affected aquifers of West Bengal.

Pyrite occurs rarely within woody fragments or carbonaceous sediments, which are formed biogenically and under reducing condition. And if arsenic is present then it is sorbed within such pyrite. This pyrite (which is not arsenopyrite) thus acts as 'sink' and not the 'source' of arsenic.

Our studies confirm that arsenic occurs adsorbed on dispersed phases of iron-oxide, which is usually present as coatings over sediment grains, organic matter and also in magnetite (magnetic oxide of iron), biotite grains. The Himalayas is a major, but not the exclusive source for arsenic. Based on our studies we infer that it is not the source but the release of arsenic from rocks to sediments and then to the groundwater, which is more important.

P Bhattacharya and R Nickson reported in the *Water Resource Development* in 1997 and in *Nature* in 1998 that the release of arsenic to the groundwater in Bangladesh and West Bengal is not by oxidation of pyrite. According to them it was by the reduction and dissolution of iron-oxide coatings with the release of sorbed load of arsenic to the groundwater.

The groundwater in the arsenic affected belt of West Bengal and Bangladesh is bi-carbonate and iron-rich, but poor in sulphate. This corroborates their reducing nature and con-

tending pyrite oxidation hypothesis. Is it necessary to know whether oxidation of reduction process is responsible for the release of arsenic into the groundwater? Yes. It is, as only then science-driven and logical remedial actions can be planned instead of adhoc actions.

The dug-wells (which are conventional wells built with modifications keeping in mind that only the shallow layer of water is utilised) are free from arsenic contamination. Had there been a pyrite-oxidation process, then these would have been the most polluted. Because of the oxygenated nature of arsenic, dissolved ferrous iron is oxidised and as the ferric iron is insoluble, it precipitates at the bottom, thus removing arsenic. Hence, dug-wells are a cheaper alternate source for arsenic-free water, provided the well is kept free of pathogen. Oxidising agents such as potassium permanganate or bleaching



powder can be added in dug-wells regularly to keep them free of pathogens.

We reported in the *Environmental Geology* in 2000, that arsenic contamination in West Bengal and Bangladesh is caused due to sedimentation below the rising sea level during the Holocene period. During the Pleistocene ice age, sediments in the Bengal Basin were exposed to erosion and oxidation. Groundwater in them was well drained due to steeper hydraulic gradients. These sediments though old are free from arsenic contamination. A rapid rise in sea level during 10,000 to 7,500 years before the present resulted in Deltaic organic rich sedimentation. Arsenic from the source area was prefer-

entially captured in these fine-grained organic rich sediments and released later to the groundwater by a reduction process. Due to poor hydraulic gradient released arsenic remained in groundwater in these sediments.

Arsenic pollution in groundwater affecting West Bengal and Bangladesh is thus a natural phenomenon. But it is triggered by the recent practice of unplanned groundwater-based irrigation and possibly due to the excessive use of phosphate fertilisers.

The management of water resources including that of groundwater both in supply and quality, development of catchment areas, rainwater harvesting, recharge of groundwater and cropping practice which demands less water are the possible solutions to the problem.

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➔ The cover story on arsenic and fluoride contamination 'The Dark Zone' and the editorial 'The true cost of water', *Down To Earth*, Vol 11 No 22, April 15, 2003 reaffirms my belief that in the coming years the greatest service and mission for us should be 'water'.

Below are some points 'issues I would like to bring attention on:

- Overexploitation of groundwater is linked directly with our ignorance about using "flood irrigation" in agriculture.
- Simple decentralised treatment methods to remove fluorides should be followed. Lime and alumina can be mixed in an earthen pot for eight hours. The water from the top of the pot should be used.
- The practice of using small Membrane Systems (ultra filtration) has become popular in many villages of southern Gujarat. These plants, installed at the village well, employ boys who supply drinking water to households at a rate of Rs 2 per bucket.
- A few years back, one of my students mixed drumstick powder in water and found that the fluoride level went down from 11 parts per million (ppm) to .08 ppm. However, more experiments are needed in this particular area. According to Ayurveda drumsticks are good for the joints.

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➔ This is in response to the story, 'Far-reaching verdict', (*Down To Earth*, Vol 12, No 2, June 15, 2003). In the report, all information on arsenic in groundwater seems to be from Dipankar Chakraborti, director, School of Environmental Studies (SOES), Jadavpur University, who is a technologist, not a scientist, and certainly not a reliable expert on hydrogeology.

Have you ever questioned why SOES always sensationalises the arsenic scare? Is it because of the scrip, arseno-dollar? Why don't you contact the Central Groundwater Board or the State Water Investigation Directorate, which has the official authority to speak on arsenic?

Why don't you consult geologists who have worked on groundwater such as Pradip Sikdar, now professor, environmental management, in the Institute of Social Welfare and Business Management? Sikdar has done pioneering work on groundwater geology, although he shuns the media, unlike Chakraborti. You can also contact Surajit Guha, who was a former deputy director general of the Geological Survey of India (GSI) or Subrata Sinha, former deputy director general of GSI and also past director of Thiruvananthapuram-based Centre for Earth Studies. Finally, should we take the judiciary as the last word after the Sardar Sarovar experience?

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"Unfounded allegations"

In the article 'A terrible accident', (*Down To Earth*, Vol 12, No 3, June 30, 2003), Sarita Bahl outlines the controversy raised by a British journalist about the earlier version of the oral polio vaccine that was tested in the former Belgian Congo. The journalist alleges that the scientists contaminated the vaccine with a chimpanzee virus that mutated to the human immunodeficiency virus (HIV), that causes Acquired Immunodeficiency Syndrome (AIDS).

The article mentions that supporters of the polio vaccine hypothesis were not invited to a Royal Society meeting in 2000. It also quotes the claims made by an Australian, Julian Cribb that the scientists tried to suppress the polio vaccine hypothesis.

This is pure balderdash. The meet-

Stop axing

The Delhi Metro Rail Corporation's (DMRC) proposal to cut down 200 trees lining Panchkuian road and Barakhambha road is very distressing. DMRC's activities in Civil Lines in north Delhi have already been disastrous.

Though I contacted the "so-called" tree helpline, run by the Delhi government, I was told that since the felling was being undertaken by another department, the agency could do nothing to stop it. Unlike Sham Nath Marg in Indraprastha College in north Delhi, where an entire avenue of trees vanished virtually overnight, Barakhambha road is surely wide enough to accommodate the DMRC's activities.

But instead of trees, if there were houses, wouldn't every effort have been made to tunnel under the buildings rather than cut trees. The only difference is that if you cut trees, then you compromise on your own health. It is not enough for the DMRC to just plant a few saplings (like it claims to have done in Civil Lines) as it's almost ludicrous to compare



saplings with trees which are over 80 years old. Even as we beat our breasts about worldwide ecological responsibility, a substantial hole is being carved out of our own lungs perhaps forever. I request the media to highlight this issue.

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ing was called specifically to consider the polio vaccine theory. The British journalist, Cribb and three other scientists supportive of the hypothesis were given the privilege of addressing the Royal Society. That the outcome of the meeting was the rejection of the poliovirus hypothesis was not a result of suppression, but rather in view of the evidence. Bahl has contributed unwittingly to unfounded allegations regarding the vaccination.

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Productive waste

The editorial 'Waste, by any other name...' (*Down To Earth*, Vol 12, No 2, June 15, 2003) is thought provoking and timely. In the past, to dispose off human excreta, people in India had adopted dry disposal systems. Every village used to have a certain area earmarked for this purpose. The soil was transported to the fields and used as a fertiliser, thus making it an ecofriendly system.

In the 20th century, we switched over to the wet disposal system, which is

a water-intensive and highly expensive method. It involves building of sewer lines and establishment of Sewage Treatment Plants (STPs). Unfortunately, a country like India cannot meet the water requirements for such a system. Therefore, we are unable to handle our sewage properly. If you study STPs today in metros, hardly any significant quantity of sewage is treated. Either the established STPs are not functioning properly, or are inactive. No wonder, the Ganga Action Plan could not clean the river water because of the failure of the STP technology. Wet disposal systems and STP technologies are developed in temperate regions, where low environmental temperatures make biodegradation a slow process, while in the tropical countries there is no such problem.

In such a scenario, the only way out is to:

- Consider human excreta as a resource rather than a waste
- Dispose off excreta after separating urine
- As urine contains urea, which is a natural fertiliser, technology to extract urea from urine should be practised

Help!

I am a resident of Barlowganj in Mussoorie (Uttaranchal), and I would like to bring to your notice the way a large company is riding roughshod over the peace of this lovely hill station. The peace of this sleepy little village has been shattered by a huge luxury hotel.

The hotel, Jaypee Residency Manor, was built with a panoramic view of the neighbouring hills and of the Doon valley. But since its construction, the only view from our houses is that of this ugly building. It has proved to be an eyesore since the builders did not make any effort to blend it into the surroundings.

The hotel is not just an assault to the eye, but also a torture to our ears. The echo of the loudspeakers at the hotel's car parking can be heard all over the small village of Barlowganj, which is spread over a rather small area. This is very disturbing for the residents as these announcements for drivers continue into the wee hours of the morning. Loud party music is also frequently played well beyond midnight on the terrace of the building. Repeated complaints to the hotel authorities have yielded no response, even letters to the police and the District Magistrate have had no effect.

Where do we go from here? Can anybody help us?

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- Excreta should be used to produce gobar gas

These steps will not only solve sewage disposal and contamination problems, it will also save freshwater resources and be a source of income. Finally, our attitude towards waste should change. Hope someone in the planning commission is reading this.

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➔ The editorial 'Waste, by any other name...' and the cover story 'By hook, crook or vision' (*Down To Earth*, Vol

12, No 2, June 15, 2003) establishes that waste is the by-product of an inefficient process that ignores the principle of optimum utilisation of inputs.

We should concentrate on ecotechnologies for conversion of waste into value-added products. Take for instance hemicellulose — a component of black liquor — which when hydrolysed (by adding hydrogen molecules) becomes a new biochemical, xylan. If further processed, it can produce natural sweeteners like xylitol that is sweeter than sugar, but low in calories. Lignin, yet another component of black liquor, if extracted before the production of cellulose can be used as a clean fuel and natural glue. In the case of bagasse, the fibre in the waste could be recovered in the form of organic cement additives and can be used as a strengthener during the manufacture of cement boards.

There are many other methods of converting waste into valuable resources. On an average, we use less than five per cent of the agro-forestry outputs and discard about 95 per cent of it. If we adopt an economic system that uses this discarded 95 per cent, we would be able to satisfy as much as 20 times more material needs without expecting nature to produce more.

JAYDEV JANA
Salt lake, Kolkata

Democratic view

The editorial on 'Ordering a new world', (*Down To Earth*, Vol 11, No 24, May 15, 2003) made me literally shudder to think of the possible consequences of a future framed under a "shared sovereignty". I would argue strongly that even though "the global problem-solving mechanisms are not working adequately", the core of a sovereign democracy is to allow its citizens to decide their political fate through indigenous struggles. Democracy can never be fostered through the gun.

Nine out of every 10 dictator or authoritarian leader in the world was supported by the us. While this worked well for them earlier, now they want to re-inaugurate the 19th century idea of

the "white-man's burden", claiming that the coloured people must be liberated from the groaning weight of their corrupt leaders.

The "new world managers" should realise that the ideological charge of this burden has considerably withered. The civil society of "old Europe" if not its leaders, with exception of the British, know this truth better than perhaps many others.

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The pesticide is the point



In February, we released a study on pesticide residues in bottled water being sold in the market. We reported how we found *legalised* pesticides in bottled water. In other words, the norms for regulating pesticide levels in these bottles were so designed that pesticide residues would not be detected.

We had no intentions of following up this study with investigations in other products. Then our readers wrote to us. They wanted to know: if what we had to say about the bottled water industry was correct, then what about soft drink manufacturers? After all, they all used water as a raw material. They also sourced their water largely from groundwater. We had, they said, a responsibility to tell.

By May, it was also evident that government was prevaricating on legislating the amended, stringent norms for bottled water. Industry pressure, we were told by wags, was enormous. Stakes were high.

Something was fishy. Most of the big players in the bottled water industry, we knew, had the capability to treat and clean the water. They also catered to hapless consumers with little choice but to pay more for water, than for milk. Municipal supplies were unreliable. Theirs was a thriving business. Nothing, not even a little pesticide, would hold it back. Then why the opposition?

Could it be that the stakes were even higher than we had imagined? Suppose,

what was really at stake was not the bottled water industry and its Rs 1000 crore business, but the soft drink industry and its estimated Rs 6000-7000 crore business. Indians drink on an average 6.6 billion bottles of soft drinks each year and business is flourishing. Suppose, just for a minute, that this industry has skeletons, which would come tumbling out if the bottled water industry was further regulated.

No, we told ourselves, this could not be true. After all, this mega industry of the beautiful people is well established. It is old. It is reputed. Giants of the corporate world control it, who swear by responsibility and citizenship.

But we were stunned. All bottles of soft drinks analysed at the Centre's pollution monitoring laboratory had pesticides, in much higher quantities than considered safe for humans (see: *Colonisation's dirty dozen*, p31). The sum of all pesticides in the PepsiCo brands added up to 0.0180 mg/l, 36 times higher than the European Union's limit (EEC) for total pesticides. Coca-Cola brands had 0.0150 mg/l of all pesticides, 30 times more than the same EEC limit.

Even more startling we found that this human health-impacting industry is more or less unregulated. The Bureau of Indian Standards (BIS) had, at least, some kind of mandatory standards for the bottled water industry. In comparison, nothing exists for this 'food' industry. It is regulated under a plethora of agencies and standards but most are meaningless or plain ridiculous. It gets licensed under the Food Products Order and further regulated under the Prevention of Food Adulteration Act, 1954. The BIS standards, set for it roughly 10 years ago, are voluntary. In other words, this massive industry has been massively let off. Worse, none of the pieces of legislation even mention the fact that raw water — over 90 per cent of the finished product — needs scrutiny. The limit for deadly arsenic and lead in soft drinks has been set 50 times higher than the allowed standards for bottled water or drinking water. Did the regulators just forget these facts? Or was it deliberate amnesia?

Let us be clear, this is not a case involving little companies struggling to make ends meet, that regulators know cannot be regulated. This involves only two large companies, which incidentally also control the world markets. More importantly, this involves an industry that is a food industry. It impacts our health. Directly.

But there are even bigger stakes at hand. The study on pesticides in bottled water brought us some predictable responses. Industry argued it is unfair to ask for stringent regulation on pesticides. We cannot afford it, industry said, and these norms are unnecessary because the pesticide residues found are in such small quantities that they are harmless. Amazing. What wisdom from such wise people. Pesticides are deadly in small quantities. They accumulate over time in our bodies. Increasing evidence shows that some pesticides — such as chlorpyrifos, a popular insecticide in India — are deadly even if the exposure is tiny. The other, I consider facetious, argument is why only target bottled water. The food we eat, say these great critics, is far more contaminated. Indians eat much more than their daily dose.

But they are missing the point. Pesticide, not bottled water or soft drinks, is the point. It is imperative to have a policy for safe use of pesticides. A policy for safe pesticides. It is clear that once our soil, food and water is contaminated, it will be prohibitively expensive to clean. We have no choice but to work on the basis of the precautionary principle. For this we need seriously stringent regulations, to curtail use and to work towards new strategies for 'safe' substances. We cannot afford to clean up after the poisoning. We have no antidote. Whatever the industry and government may believe.

I do not know how the two corporate giants will receive our findings. But for me, the more important matter is if you, our readers, believe that we have done justice to the question you asked us. The consumer in the free world, they say, is king. So let the king pass sentence. ■

— Sunita Narain

A broken check-dam



Cannot a sound tradition smear

WHEN one contests the dominant, it is of utmost importance that all actions and their outcome be above doubt. There isn't the faintest margin of error. There cannot be misfortune. The villages of Alwar district have known this for a long time. For about two decades now, they have got help from Tarun Bharat Sangh (TBS), a voluntary group. TBS learnt in its salad days in the villages that the region had a rich tradition of building earthen check-dams called *johads* to harvest rainwater. So TBS mobilised and supported village communities, identified skilled (but unrecognised) *johad* engineers and nurtured them. The result, as has now been widely studied and appreciated, was an economic miracle that transformed the region.

But from the very beginning, TBS associates encountered only hostility from government agencies. The Indian government likes only high-input solutions beyond villagers' means. Nowhere was this more obvious than in the case of the *johad* built at village Lava-ka-Baas in 2001.

The state irrigation department declared the structure unsafe and illegal, passing orders for its demolition. It took a team of eminent people and an engineering professor — and a media blitz — to prevent the demolition. So, when the *johad* succumbed to a night of unusually high rain and a flood of water released by poorly constructed structures upstream, the government went to town reminding everybody that its department had declared it unsafe. It didn't bother to remind the people that TBS and the village were not allowed to carry out measures to make the check-dam strong enough to resist an unprecedented downpour. The fact that a concrete dam built by the department last year in a neighbouring *tehsil* got breached 20 days before the Lava-ka-Baas *johad* (after about less than half the rainfall that washed off the *johad*) was lost as well.

The entire incident should be taken out of the blame-game it is wallowing in at the moment. The Lava-ka-Baas *johad* broke. Such misfortunes do occur. It would be better for TBS to think of the facts. They and the villages of Alwar must take criticism in their stride and get back to their drawing boards. There is harder work ahead. This is no longer their struggle only. The check-dam is the symbol of millions — a symbol of freedom and joy of living. We cannot let some bad words wash it away. ■

Chilli's red



Look deeper. It gets redder

FRANCE may have rejected consignments of chilli powder from India because a banned carcinogenic colouring matter — Sudan red 1 — was detected. The European Commission (EC) may have introduced more stringent measures to prevent such goods from entering its market. And the Spices Board India may have axed the exporters responsible for the contamination. But first question first: what was a banned substance doing in the chilli powder?

The banned colouring matter Sudan red 1 is a chemical dye. Even the Prevention of Food Adulteration Rules, 1955, of India prohibits the presence of any colouring matter (not even food grade colours) in chilli powder sold in India. So, it shouldn't come as a surprise that the French and the EC took the steps they did. They acted in their interest. They had an obligation to protect the health of their people.

But, it has now become a regular mantra of the export fraternity to cry foul over measures taken by developed countries on sanitary and phytosanitary grounds. We have also many a times criticised such measures as non-tariff barriers. At times such arguments are legitimate. But surely not all the time?

This time it certainly isn't. Our own domestic rules prohibit the presence of any colouring matter in chilli powder. So there is no logical reason for exportable products to be contaminated. It is not justifiable.

What is scarier is that the use of the carcinogenic dye in chilli powder made and sold in India is rampant. It is frightening to learn that some of the traders use the dye believing that it is a permitted "food grade" colour. Even worse, contamination doesn't end with chilli powder. In recent times, export consignments of several other products have also been rejected due to the presence of various banned substances. Seedless grapes and table grapes in consignments sent to the Netherlands, for instance, had residues of pesticides.

This list could go on. But the bottomline is that we can no longer cry wolf about unfair food standards. It is time we put our house in order. For our sakes. We need good research on standard-setting so that we can challenge the international community, when and where the standard is unfair or a non-tariff barrier, as they say. But beyond this, we cannot hide behind the excuse of poverty anymore. Dirty trade practice is not about poverty. It is about callous and irresponsible trade practices. It is about the lack of regulation and governance. Let us get this straight. ■

Breach of law

Orissa violates fifth schedule, OKs mining in tribal territory

KUSHAL P S YADAV

In a move that threatens to dislocate the lives of millions of Orissa's tribal people, the state government has decided to allow transfer of land in fifth schedule areas for mining and industrial operations. En route, it has interpreted the Supreme Court's (SC) landmark Samata judgement of 1997 to suit itself.

The apex court had ruled in the Samata versus state of Andhra Pradesh (AP) case that tribal tracts and forestland in scheduled areas were not to be leased out to non-tribals for mining and industrial activity, as this would contravene the fifth schedule of the Constitution. According to the SC directive, such operations could only be permitted exceptionally — subject to the laws of the state concerned. The SC had stipulated that in instances where the law does not completely ban mining in scheduled areas, a state-level cabinet sub-committee should be constituted and a suitable decision taken thereafter.

During the second week of July 2003, a sub-committee — headed by Orissa chief minister (CM) Naveen Patnaik — conveniently concluded that the judgment was not binding on the state. "The inference is totally erroneous because the apex court's ruling is obligatory for all states," contends Rajeev Dhavan, the SC advocate who represented Samata — a social action group of AP.

The Orissa sub-panel's decision was premised on the claim that ample provision had been made in the state's existing laws to protect tribal interests. The rules cited in this regard were the Orissa Scheduled Areas Transfer of Immovable Property (Scheduled Tribes) Regulation (OSATIPR), 1956, and the Orissa Zilla Parishad (Amendment) Act, 1997.

"The state government has mentioned these two laws to give its dubious agenda a veneer of legitimacy," alleges Bibhu P Tripathi, an Orissa-based advocate. But the fact that certain clauses of OSATIPR itself forbid transfer of land

from tribals to non-tribals, weakens the authorities' case further. "The Orissa government is not even conversant with its own laws," asserts Tripathi.

Highlighting the ludicrousness of the cabinet sub-committee's stand, he elaborates: "It goes against the grain of a recent amendment to OSATIPR. The new clause, inserted in 2002, explicitly states that no member of the scheduled tribes can transfer any land if the size of their holding gets reduced to less than 2 acres (0.8 hectares) of irrigated land or 5 acres (2 hectares) of non-irrigated tract in the process." Tripathi observes: "The suggestion of the sub-panel will, in effect, violate the regulation because tribal families would be left with no land at all." Ravi Rebba Pragada of Samata, Hyderabad, wonders: "How will the state government arrange for more land to rehabilitate the displaced tribals?"

The zilla parishad act safeguards the tribal people's rights even more stringently. "Notwithstanding anything contrary in this act or any other law, no prospect licence or mining lease for minor minerals or concession for the exploitation of minor minerals by auction shall be granted under any law ... except with the prior recommendation of the parishad," it notes. The state's past record indicates that tribal communities will not be consulted on the issue.

"Rather than regarding the Samata case as a point of reference and insulating tribals, the Orissa government has paved the way for mining in scheduled areas by signing a memorandum of understanding with private companies," charges Tripathi. "The decision will shut out local people by divesting them of their land, and open the floodgates to multinationals," laments Krushna C Sounta of Prakrutika Sampada Suraksha Samiti — an Orissa-based tribal rights

group. A terse A S Sarangi, principal secretary in the state's scheduled castes and scheduled tribes welfare department, says: "No comments."

For its part, the state government purports to have announced a "comprehensive" rehabilitation package to support the oustees. However, it has failed to fully comply with the SC order on this front as well. The sub-panel has declared that companies would be required to spend five per cent of the net annual profit earned in each project on development activities such as health-care, education, communication, irrigation and agriculture within a radius of 50 kilometres of the affected area.



RICHARD MAHAPATRA / CSE

Undermined: tribals point to a declaration of local self-rule in their village

The SC had ruled that when states give out land in scheduled areas, at least 20 per cent of net profits should be set aside as a permanent fund for the development of local tribals. And this allocation did not include the expenditure for reforestation and maintenance of ecology. "Orissa is legally bound to follow the stipulation. It is also consistent with the Constitution and directive principles of state policy," stresses Dhavan.

Pragada is sceptical: "The state government appears to be in a hurry to evict local people and sell the land for mineral extraction. A step that would be blatantly anti-tribal." ■

Smells like trouble

Kiwi farmers to foot the bill for their well-fed cattle

NEELAM SINGH

The tax liability of New Zealand's farmers is set to rise because their bovine assets — hold your breath — belch and break wind!

That cattle discharge methane (a greenhouse gas) while performing these natural bodily functions is not news. The subject of 'survival emissions' from livestock in developing countries has also been debated threadbare. What is unprecedented is an industrialised nation like New Zealand deciding to impose a levy on cattle and sheep to fund research on curbing methane emissions from the animals.

Not surprisingly, the country's farmers have kicked up a stink. Dubbing the proposal as the "fart tax" plan, they have got their message across by despatching manure through post to the prime minister, agriculture minister and climate change convenor. But the government, far from being cowed, is in no mood to backtrack.

The proposed tax, which was announced in June 2003, comprises an annual levy of 72 New Zealand cents (us \$0.43) per head of cattle and 9 New Zealand cents (us \$0.05) on each sheep. Pigs and poultry have been exempted since their emission levels are negligible. The tax is expected to generate us \$4.9 million annually. New Zealand intends to introduce it as a part of its effort to reduce greenhouse gas emissions under the 1997 Kyoto Protocol.

On July 15, 2003, agriculture minister Jim Sutton asserted: "The issue now is not whether there will be a levy. The question is how the levy will be collected, who will administer it and how it will be spent." Sutton was speaking at the annual conference of Federated

Farmers (FF) in Auckland. Justifying the move, he mentioned the recent waiver granted on charges pertaining to other farm emissions.

For its part, the federation — a national organisation of over 18,000 farmers — passed a resolution directing the agriculture industry not to collect the levy on behalf of the government. Meanwhile with the farming community taking to the streets, FF's Southland president Lionel Patterson feels the nationwide agitation could snowball into something similar to the farmers' revolt of 1986 against the then government's fiscal policies. "It (the proposal) really amounts to the authorities saying: 'You don't support us, we don't like you and you will pay accordingly'," says an editorial in *The National Business Review*. It suggests that the ruling party is "punishing" farmers since they form a strong support base of the National

led collaborative venture established in December 2002.

Imposing such a tax will get in the way of the country's competitive advantage, avers Ivan Lines, president of New Zealand Institute of Primary Industry Management. It may be noted that dairy and meat exports make a substantial contribution to New Zealand's economy. Farmers argue that if they are to be taxed for the natural activities of farm animals, they should also get the benefit of sequestering carbon dioxide by trees on their properties.

But there are those who support the government's move. "The farmers are implying that somehow when it comes to them, the 'polluter pays' principle does not apply," observes Cath Wallace, chairperson of an umbrella group of environment and conservation organisations in New Zealand, in a media release. About 40 per cent of the country's total greenhouse gas emissions are due to methane released by ruminants.

The animals include 46 million sheep and nine million cows. The situation is unique to New Zealand because in other industrialised nations energy production and industrial activity are the major sources of pollution.

Experts opine that nutrition as well as the animal's bodyweight and size play a major role in emission of the gas. The rumen of cattle contains a large number of microorganisms that break down the consumed plant material, mostly grass, through fermentation. Methane is released in the process and discharged into the atmosphere by the animal. In the EU, infusion of a dose of methane-eating bacteria reduces emission of the gas from sheep by up to 17 per cent.

For the present, the two sides continue to lock horns on the tax proposal. Even as the New Zealand government has made it clear that it means business, farmers are determined to prove that their stir is not just hot air either. ■



Party — the mainstay of the opposition.

According to Jeff Grant, chairperson, agro-sector group Meat New Zealand, meeting Kyoto commitments will benefit the entire country so the government itself should fund the research in public interest. The farm sector is already said to be doing its bit by investing in studies to mitigate emissions from livestock through the Pastoral Greenhouse Gas Research Consortium, an industry-

GLOBAL / NGOS

Contentious stocktaking

A report on the role of non-governmental organisations (NGOs) in present-day society and the future of such bodies ran into trouble even before it could be released. The document was held back when environmental pressure group Greenpeace UK objected to misrepresentation of its stance. It was reprinted after changes were incorporated in the “flawed précis of their views”.

The study — *The 21st Century NGO: In the Market for Change* — is a collaborative venture between SustainAbility, an international consultancy on business strategy and sustainable development, the United Nations Global Compact (UNGC) and the United Nations Environment Programme (UNEP). Its thrust is to gauge the terms of engagement between NGOs on the one hand, and businesses and governments on the other — and how these are likely to change in the future.

“The good news for NGOs is that they are emerging as key ingredients in the health and vitality of markets. They are also highly trusted, far more so than business or governments,” says John Elkington, SustainAbility’s chairperson. “The bad news is that unless they recognise and address growing financial, competitive and accountability pressures, their impact will be significantly reduced. For those that respond intelligently and in time, the prize is to be amongst the most influential institutions of the 21st century,” adds Elkington. The report points out how NGOs are increasingly moving to modes of operation quite similar to the corpo-

rate sector, and how they need to show the same accountability that they demand of businesses in this changing scenario.

With a theme as sensitive as this — in several places across the world the fight against the influence of multinational corporations is led by NGOs — controversy was, perhaps, inevitable. Stephen Tindale, executive director of Greenpeace UK, says he “objected very strongly to the original report because it contained an extremely inaccurate sum-



mary of my views on accountability”. Being answerable is indeed vital, but different organisations are accountable in different ways, he asserts. “It is bizarre to suggest that Greenpeace believes organisations like ours do not need to be accountable ‘so long as they do not break the law’. Greenpeace has often taken peaceful direct action to challenge bad laws, many of which have changed as a result. ...We accept full responsibility for (our) acts of civil disobedience,” states Tindale. ■

INDIA / FELLING

Shady deal?

Corruption charges are flying thick and fast against Kerala forest minister K Sudhakaran and the state forest department (FD). The opposition Left Democratic Front (LDF) has accused Sudhakaran of accepting bribes worth Rs 5 crore in a softwood auction involving the now defunct Mavoor unit of Grasim Industries Limited (GIL). On July 7, opposition leader V S Achuthanandan alleged in the state assembly that the minister received illegal gratification to exempt GIL from meeting its contractual obligations and liabilities after the pulp unit at Mavoor shut down.

Ever since the closure in 1999, about 131,000 tonnes of bamboo and softwood were left to rot in the various GIL depots. As per the agreement, the state government was free to recover compensation at market rates. But the FD certified the wood as worthless, auctioned it off in bulk and ended up exempting the company from paying its dues at prevalent prices, Achuthanandan charged.

Sudhakaran refuted the allegations saying the FD had auctioned the softwood to realise “at least some amount from a company that had a reputation of evading payments”. He also claimed the chief conservators of forests (CCF), vigilance and northern range, and the Kerala Forest Research Institute had certified that the raw material was worthless. He has now served a legal notice on Achuthanandan.



ALEX AGUIAR / GRC UNIVERSITY OF BARCELONA

GLOBAL / OCEANS

Talks lack depth

Sixty per cent of the world’s ocean area is categorised as international waters and prone to exploitation. Yet the need to safeguard fragile ecosystems in areas beyond national jurisdictions was left unresolved at two international meetings — ‘Defying Ocean’s End’ (DOE) in Los Cabos, Mexico, and the open-ended Informal Consultative Process on Oceans and the Law of the Sea in New York, USA. Government del-

egates merely recommended that the United Nations General Assembly (UNGA) reaffirm the value of marine protected areas as a management tool and call on the international community to develop a global system of such zones. A gathering of scientists sought the creation of a world ocean public trust to manage international waters. The UNGA was also asked to draw up an inventory of flag state obligations to ensure implementation of international navigation safety rules. But this list is not legally binding. ■

SAO TOME & PRINCE/ COUP

Scramble for the spoils

Oil politics has reared its ugly head yet again. This time in the tiny twin island African state of Sao Tome and Principe — a former Portuguese colony banking on future prosperity from offshore oil reserves. An army major, Fernando Pereira, seized power in a pre-dawn coup even as President Fradique de Menezes was on a visit to Nigeria. Pereira was aided by the opposition party. Most elected leaders of the country's government, including Prime Minister Maria das Neves, defence minister Fernando Daqua and minister for natural resources Rafael Branco were held captive for about a week before they were released following mediation by Congo's foreign minister, Rodolphe Adada. Branco, it may be added, is responsible for negotiating the development of Sao Tome's large but still untapped offshore oil reserves. Significantly, President Menezes has been accused of corruption while dealing with the industry majors.

Oil companies ExxonMobil and Shell expect to produce one million barrels a day in 10 years. In 2001, Sao Tome and Principe signed a deal with Nigeria agreeing to split all revenue from offshore oil found in shared waters. Also hopping on the bandwagon are the us and Angola.

GLOBAL / AIDS

Fund crunch diagnosed

Even as the progress made in anti-AIDS research was discussed at the Conference on HIV Pathogenesis and Treatment, participants expressed concern over the acute shortage of money needed to pass on the benefits of such studies to affected people. It was observed at the meeting — organised in Paris by the International aids Society — that six million HIV positive people were in urgent need of anti-retroviral drugs, and the annual cost of their treatment would work out to us \$10 billion.

Apparently, the grants being provided by organisations such as the Global Fund for AIDS are not adequate. In its first two rounds of grant applications, the global fund approved us \$1.5 billion over two years for more than 150 programmes in 92 countries. This money would suffice for the retroviral treatment of only 500,000 infected people and for providing educational support to the same number of children who have been orphaned due to AIDS. But since these funds are also meant for the treatment of malaria and tuberculosis, their availability for AIDS goes down considerably. ■

INDIA / MARINE BIODIVERSITY

Delving into algal systems

O rissa's Utkal University in Bhubaneswar has been chosen as one of the four regional study co-ordination centres to explore hitherto unknown plants and microorganisms of India. Its research will focus on freshwater algae — both still water and running water — in different climatic zones. The exercise is part of an 'All India Coordinated Project on Taxonomy', initiated by the Union ministry of environment and forests (MOEF). The three other centres are based at the universities of Lucknow, south Gujarat and Mysore.

The Utkal varsity team is headed by S P Adhikary. "Our group aims to deepen the understanding of algae, which have an important role to play in any marine ecosystem," reveals Adhikary and adds: "Algae produce many valuable biochemicals and are a potential source of microbes for use in biotechnology." ■



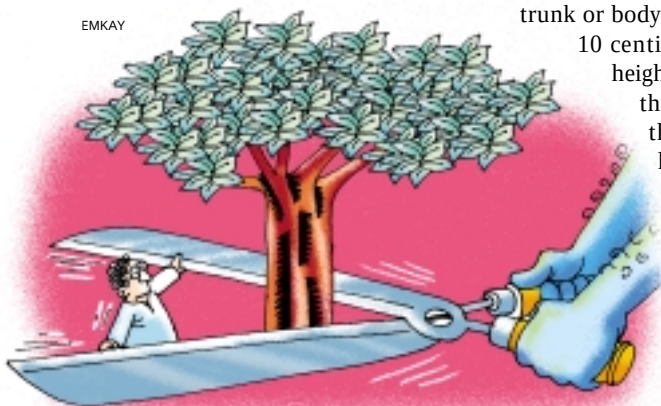
Point of focus

INDIA / LEGISLATION

Nipped in the bud

But for timely intervention by environmentalists, the West Bengal government would have signed the death warrant of whatever little greenery is left in the state's non-forest areas.

EMKAY



The West Bengal Trees (Protection and Conservation in Non-Forest Areas) Bill was withdrawn after green groups managed to acquire copies of the proposed act and staged strong protests against it. The draft bill obscurely defines a tree as "any woody plant whose branches spring from and are supported upon a trunk or body, (which) is not less than 10 centimetres in diameter at a height of 30 centimetres from the ground and is not less than four metres (m) in height from the ground level". Simply put, a tree is not a tree if it is not more than 4m tall. The implication is that if the plant's height is less

than 4m, it can be cut down.

Though the proposed legislation stipulates that prior permission must be sought for chopping down a tree, it legitimises felling if the competent authority fails to arrive at a decision within a month. More appallingly, offenders are not only let off with a petty Rs 5000 fine for carrying out unauthorised felling, they get possession of the tree as well. Environmental activist Mukuta Mukherjee avers: "The timber or land mafia seemed to have had a say in the drafting of this bill." Mukherjee roped in Calcutta High Court advocate Gitanath Ganguly and former green bench judge Bhagawati Prasad Banerjee for compelling the state government to abort the move. ■

INDIA / WILDLIFE

Bright idea

It's big! And it's glowing! Is it a blob from outer space? No, it's just an elephant.

Following a series of accidents in which speeding vehicles collided with elephants, the Wildlife Trust of India is kitting out Delhi's pet pachyderms with reflectors to make them more visible to drivers in the dark.

After several failed attempts with trinkets tied round the animals' ankles and colourful velcro bands, two of the capital's fleet of 30 elephants have been



EMKAY

provided with the reflecting fabric. It is to be hung beneath their tails by ropes. If the project is successful, the rest of India's 5,000 domestic elephants will also be similarly attired.

To avoid traffic congestion, elephant owners in Delhi are permitted to take the animals out only at night or for three hours in the afternoon. Earlier, elephants were used to transport logs. Nowadays, they serve mainly as carriers of advertisement hoardings or are required during ceremonial occasions. Their owners are paid between Rs 5,000 and 10,000 per day. ■

EUROPE / WEATHER

Mercury zooming

Europe is facing its worst heat wave in decades. While the scorching sun has come as a blessing for holidaymakers, widespread crop failure and forest fires have got farmers and the administration worried. At places, water levels

Sweating it out

ALESSANDRO BIANCHI / REUTERS

have sunk so low that power companies are unable to generate any electricity and water traffic has come to a standstill. In parts of the continent, there are fears of 80 per cent crop failures.

European Union agriculture ministers have met in Brussels to discuss a financial bail-out plan for farmers. The ministers have petitioned the European Commission for assistance in tackling the cash flow crisis. EU farm commissioner Franz Fischler has already called the drought a "catastrophe", and has said the Commission is looking into ways for help.

Italy has already taken emergency measures by releasing water from the Alpine hydro-electrical basins as the Po river touched a historical low of 10 m. Churches have been holding mass vigils, staying open for 24 hours. Forest fires have been reported in Italy, Spain, Portugal and Croatia. ■

INDIA / RESEARCH UNIT

Eligibility crisis

India's plan to open its fourth poison information centre has run into problems over non-fulfilment of basic criteria. A World Health Organisation (WHO) team recently inspected the Industrial Toxicology Research Centre (ITRC) in Lucknow, where the unit will be based, and raised a few objections.

Ideally, a poison information centre should be attached to analytical laboratories and hospitals so that the data it generates can be used quickly in any life-threatening situation. ITRC, how-

ever, would only be able to provide analytical services, as it is not linked to any hospital in the area. The centre doesn't satisfy another condition — that of staying open for 24 hours. "We will rectify this by assigning four scientists in the organisation, who can be contacted at any time during an emergency," explains R C Srivastava, initiator of the project and former head of ITRC's analytical toxicology department.

At present, India has three poison information centres: in Delhi, Ahmedabad and Chennai. They provide toxicological information on different poisons. ■

PRESERVING WISDOM: Sri

Lanka has proposed to draft a bill to protect the traditional knowledge associated with medicinal plants. Initiated by the country's ministry of indigenous medicine, the proposed legislation will be drafted by the National Intellectual Property Organisation of Sri Lanka (NIPOS).

According to NIPOS, the bill is intended to devise a legal framework for the protection of traditional knowledge relating to medicinal plants. At present, a working document of the draft bill is being studied. It will subsequently be improved by a committee.

All medicinal plants of traditional value will be the property of the government. In order to protect individuals and families having knowledge of traditional medicinal plants and to give them better recognition, a voluntary registration scheme will be introduced with NIPOS. Abuse of such knowledge will be treated as a criminal or civil offence under the bill.



AFRICA / OIL

Greasy step forward

The landlocked African nation of Chad has begun pumping oil to Cameroon through a 1000-kilometre underground pipeline as part of a deal aimed at alleviating poverty in both countries. Chad's leaders have given an assurance that they would invest the majority of the revenue in education, health and agriculture. But experts fear the project could bring about an environmental disaster and will actually not benefit the people of either country.

Sponsors, however, believe the venture could yield revenues worth us \$2 billion for Chad and us \$500 million for Cameroon over 25 years. The deal was inked in 1996 and construction of the pipeline began in 2000. Initially, about 50,000 barrels are expected to be produced each day. Later, this could go up to 250,000 barrels, discloses Simon Tamfu, commercial director, National Hydrocarbons Company of Cameroon.

The World Bank supplied 3 per cent of the financing for the project. It has set up an independent panel to monitor the money generated, considering widespread corruption in the region. The stakeholders are ExxonMobil, Petronas-Malaysia and ChevronTexaco. ■

INDIA / RESEARCH

Weighty device

The National Geophysical Research Institute (NGRI), Hyderabad, has procured an instrument that can measure the absolute gravity at any location with great accuracy. The absolute gravimeter (AG) has been purchased from US firm Micro G Solutions for Rs 1.8 crore. The Council of Scientific and Industrial Research and Department of Ocean Development have provided funds for the machine, which is the first of its kind in India.

According to NGRI scientist Bijendra Singh, "The apparatus is based on the simple principle of free-falling bodies. This is a high precision, transportable instrument." The AG will be used to study vertical crustal deformations on the earth arising out of tectonic disturbances. It will also monitor the vertical deformation at tide gauge stations

along the Indian coast to distinguish sea level fluctuations resulting from climate change, and will explore for minerals and petroleum.

The AG will soon be mounted at Visakhapatnam, Goa, Chennai, Delhi, Nagpur and Dehradun. It will also be taken to Antarctica during the summer camp of 2003-2004 to establish an absolute gravity station at the Indian camp. ■



COKE VS KILLER SPRAY: The Colombian government is caught between a rock and a hard place. A court has ordered the country's government to stop spraying Monsanto's glyphosate herbicides on coca and other crop plantations until more research is done on the chemical's possible ill-effects on health and the environment. But the US-backed glyphosate-spraying programme was said to be an effort to control the production of cocaine, which involves use of coca leaves as raw material.

The government, for its part, claims the herbicide is safe and plans to appeal the ruling. In the meantime, it also plans to continue with the spraying. Environmentalists, activists and farmers maintain that the herbicide has already damaged legal food crops and is harmful to human health.

SANHO TREE



INDIA / POACHING

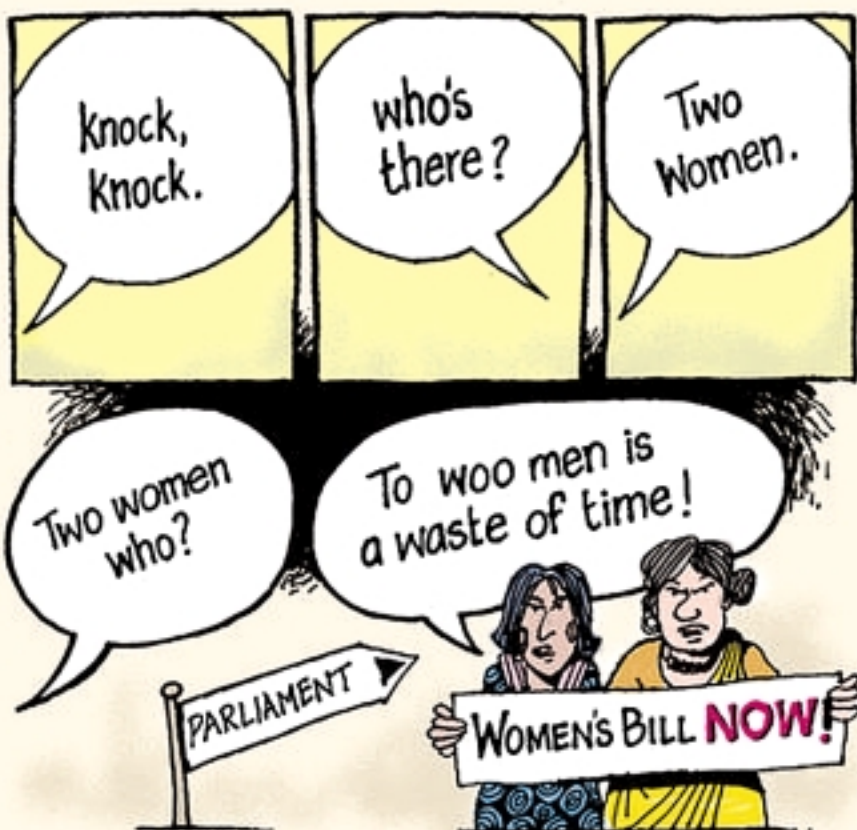
Passing the buck

Wresting absolute control of forests but refusing to shoulder the blame when things go wrong — this attitude can be attributed to just about any state forest department (FD) in India. The Mizoram FD is no exception.

After assiduously vowing to protect wildlife and usurping the people's right to manage forests, it has punished villages surrounding the Ngengpui Wildlife Sanctuary for being uncooperative. The FD claims that local inhabitants refused to lend a hand in its efforts to trace poachers who had recently killed two elephants inside the sanctuary.

FD officials told the media that the divisional forest officer of Chhimtuipui forest division had been instructed to suspend all eco-development works in surrounding villages. ■

COMMENT RUSTAM VANIA





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India in the red

Exports of contaminated chilli powder raises fears at home

VIBHA VARSHNEY & CLIFFORD POLYCARP

INDIAN exporters of chilli products are smarting. The EU has all but shut the door on them after recently detecting the presence of Sudan red 1, a carcinogenic industrial dye, in one of their consignments to France. And the Spices Board of India has cracked the whip on the three export companies whose products were found contaminated. The unsavoury row has thrown up serious questions regarding the domestic market, too, where adulteration is said to be rampant.

But the authorities merely cite laws to parry the posers. "The Prevention of Food Adulteration (PFA) Rules, 1955, prohibit the use of any colouring matter in chilli powder sold in India," explains a senior official of the Union Ministry of Health and Family Welfare's PFA division. "The Central Food Laboratories

test samples of the product and are equipped to detect the presence of any colouring matter," he adds. It may be noted that a Pune-based research organisation has found adulterants such as Sudan 1 in some branded and non-branded chilli products. So much for the safeguards!

The export fiasco which took place in May saw the European Commission (EC) stipulating that in the absence of documentary evidence of purity, no hot chilli or chilli products from India would be allowed to enter the EU market. The EC's decision is likely to have an adverse impact on the export of these products, which account for 20 per cent of the US \$300 million Indian spice exports industry. The EU authorities justify their action, highlighting the serious health effects of Sudan red 1. "It is a chemical dye and is not permitted in food," says a

spokesperson of the EC (see box: *Chilling facts*).

The Spices Board of India has suspended the licences of three Mumbai-based companies — Gautam Export Corporation, Patons Exports Private Limited and Volga Spices & Masala Mills (Private) Limited. The exporters expectedly deny the presence of carcinogens in the chilli powder. J J Advani, partner, Gautam exports, and director, Patons exports, says that the EC order is actually a non-tariff barrier.

K P Sarin, executive secretary, All India Food Processors Association, New Delhi, sees a larger controversy. "The decision to add dye is likely to have been taken by both the exporter and importer," he avers. While Sarin concedes that the unpackaged material available in the market is adulterated, Advani claims he knows "interesting facts" about well-known chilli powder brands also.

It is an open secret that colouring agents are added to chilli to mask its poor quality. A trader in Khari Baoli, a Delhi-based wholesale market for spices and chemicals, informs *Down To Earth* that "food grade colours" such as oil orange and oil red are sometimes used for the purpose. What he leaves unsaid is that oil orange is another name for Sudan red 1. It is used more widely than food grade orange colour because it is much cheaper.

Chillies are included in the list of notified commodities for which the Export Inspection Council of India (EIC) — under the Union ministry of commerce — is authorised to conduct pre-shipment checks. This rule was waived earlier if the importer did not ask for a certificate. Now, EIC has decided to make certification mandatory.

When asked to comment on the EC order, officials of the Spices Board of India clammed up on the pretext that the matter was "sensitive". An EIC official, however, exuded scepticism: "There were times, when rejected consignments were found to be up to the mark on being tested again." Vijay Sardana, executive director of New Delhi-based Centre for Trade in Agriculture and Agro-based Industry, is of the view that the entire episode is a consequence of the unregulated Indian market. ■

Chilling facts

About Sudan red 1

Sudan red is a grade three carcinogen, which has been found to be harmful for animals as well as humans.

According to the France-based International Agency for Research in Cancer (IARC), Sudan red can cause tumours of the liver and urinary bladder in rats. The IARC comes under the

World Health Organization. A study carried out by the department of biochemistry, Charles University, Albertov, Czech Republic, in 2002 shows that the chemical induced similar effects on the liver microsomes of humans and rats. In research conducted in Japan, azo dyes (which include Sudan red 1) were found to set off morphological changes in the kidneys of rats fed on them.

Takeover bid

Bihar government has fresh designs on Bhoodan land

SOPAN JOSHI

WITH Bihar's revenue minister Ramai Ram informing the legislative assembly on July 7 that the state government was actively considering an amendment to the Bhoodan Act, the battle for control of such tracts has intensified in Patna. At stake is more than 160,660 hectares (ha) of land, which is still in the hands of the Bhoodan Yagya Committee for distribution but has not been verified by officials of the revenue department. Ramai Ram has long argued for the abolition of the panel to bring this land under the direct control of revenue authorities.

Bhoodan, a land reform movement started in the 1950s by Gandhian leader Acharya "Vinoba" Bhave, resulted in the large landowners of Bihar pledging more than 809,370 ha of land for distribution among landless farmers. In 1954, the Bihar Bhoodan Yagya Act laid down the procedure for collection and distribution of donated land. The committee, an autonomous body with an annual grant of Rs 16 lakh, was an outcome of this legislation. The Bhoodan movement petered out in the 1960s and Bhave died in 1982, leaving behind a lot of land. Most of it has not been distributed for various reasons.

The arithmetic of the current political drama involving Bhoodan shows how the Bihar government, which actually controls all land transfers through the district administration, has shown little initiative to distribute Bhoodan land. No government records were available for 26 per cent of the land that was pledged. More than 20 per cent was found to be hilly land or forestland, which was unfit for cultivation. Thirty-four per cent was distributed by June 1999 and 19 per cent is still with the committee for distribution but has not been verified by the revenue authorities. Of the 34 per cent distributed tracts, more than half are disputed. Either the allottees haven't got possession of land or the revenue authorities haven't given them title deeds, which is known

to require payment of bribes.

The chairperson of the committee, Bhavesh Chandra Prasad, has several complaints ranging from non-payment of salaries to the committee staff to non-availability of government surveyors to mark out plots for distribution.

Pradeep Priyadarshi of the Bihar chapter of Ekta Parishad says that they want an independent task force to draw up a comprehensive plan to distribute Bhoodan land to the landless. Ekta Parishad is a network of grassroots organisations that campaigns to bring land reform back on the political agenda in five central Indian states. ■

STOP PRESS

The government has finally notified new standards for bottled water. A notification issued by the Union health and family welfare ministry on July 18 stipulates 0.0005 milligrammes per litre (mg/l) to be the maximum residue limit for total pesticides, and 0.0001 mg/l for an individual pesticide in packaged drinking water. The new norms, which will come into effect from January 1, 2004, thus reflect the European Economic Commission stipulation on pesticides in bottled water. (See *Colonisation's dirty dozen*, p 31)

Rule relaxed

TN unshackles timber transport

E VIJAYALAKSHMI

THE Tamil Nadu (TN) government has lifted the ban on the inter-state movement of timber. The decision will facilitate the transport of timber from TN to other states. Further, even teak, rosewood and silver oak — which are included in the scheduled list — can now be moved out of TN, subject to permits being granted under the 1968 Timber Transit Rules. It is noteworthy that earlier the movement of timber that fell into this category was completely prohibited.

The recent order also allows neighbouring states to import timber through TN ports and transport them out of the state without permits. The state government hopes that this directive will boost the revenue of ports such as the one in Tuticorin.

Significantly, Tuticorin port has become one of the major hubs of timber import in south India. It scores over other ports because it has a provision for storing timber logs over long periods. That it is becoming a preferred destination is borne out by the fact that over 1.06 lakh tonnes of timber logs were handled at Tuticorin port between April and June 2003. As against this, only 56,000 tonnes of timber made its way to the port in the corre-

Right of passage: timber movement through TN made easy



sponding period last year.

The easing of the regulations is likely to see timber merchants from neighbouring states such as Kerala, Andhra Pradesh and Karnataka operating through Tuticorin. Previously, their activities were hampered because even if they imported wood through these ports, transporting it out of Tamil Nadu was not allowed since timber was covered by the Essential Commodities Act.

Officials opine that such an order was long overdue because imported timber shipments had the potential to cause a severe glut in the market. Domestic timber prices could crash due to surplus stocks, discouraging neighbouring states from using TN ports. This in turn would have led to loss of valuable revenue for Tamil Nadu.

With the planned felling of extensive teak plantations in the Cauvery basin (comprising Cuddalore, Thanjavur, Nagapattinam and Thiruvallur districts), the state forest department anticipated added pressure on the market. "We have raised plantations along the Cauvery canals for the past 30 years. Now we want to fell these and opt for fresh cultivation," points out a forest official.

While timber merchants in the state have welcomed the order, they are dismayed by the stringent timber transit rules. "The felling and transport of scheduled list timber is governed by severe laws. For instance, obtaining the felling order and transporting timber (even silver oak) has become laborious and time-consuming," laments S P Jayakumar, a timber trader of TN. "That is why we purchase timber from Karnataka where the procedure is relatively less complicated," he adds.

Meanwhile, the Kerala State Small Industries Association (KSSIA) has reportedly urged the Kerala government not to withdraw the order banning inter-state movement of 49 varieties of timber, including rubber, to other states. This order was issued in 1981 to protect Kerala's wood industry. KSSIA members feel that if the regulation is watered down, it would adversely affect packing case, veneer plywood and match-box making units.

So far as the Tamil Nadu government is concerned, there appears to be no going back on its decision. In the long run, the prospective gains are too tempting a proposition for the state to log off. ■



Healing touch

J&K proposes prescription for reviving medicinal plants

ISHFAQ-UL-HASSAN Srinagar

IN ORDER to stem the sudden decline in the numbers of medicinal plants in Jammu and Kashmir (J&K), the state government recently repealed the Kuth Act. The move is expected to encourage local people to cultivate medicinal and aromatic plants on their own land, with technical know-how being provided by the authorities.

"Earlier, under the Kuth Act, cultivation of these plants involved cumbersome procedures. Now any individual can participate in the activity," reveals P Patnaik, principal chief conservator of forests, J&K. According to Ghulam Mohidin Sofi, the state's forests and environment minister, these steps are meant to pave the way for a biomedical project that will be unveiled in Ganderbal later this year. The scheme would be propagated in other areas of J&K as well to make it a lucrative source

of income for the people.

In another development, the Regional Research Laboratory (RRL), Kashmir, has set up nurseries to prepare the germ plasma of rare plant varieties. "There are about 700 medicinal plant species recorded in the British Pharmacy, of which 50 per cent are found in J&K's temperate region," discloses A S Shawl of RRL. The government has also decided to reactivate the dormant state herbal board.

It may be noted that in recent years smuggling of medicinal and aromatic plants has reached distressing levels in the state. Of the 100 plants endemic to the region, nearly 20 have been categorised as "highly endangered" because of human interference. The smugglers hire nomads living at high altitudes to collect the plants, "and pay them a pittance", says Tariq Ahmad, senior scientific assistant at the Regional Research Institute for Unani Medicine. ■

FOLLOW - UP

AASU'S ULTIMATUM: Apparently agitated over former Union minister Suresh Prabhu's plans to drain out excess water from the state, the All Assam Students' Union (AASU) has said that it would never compromise on the issue of networking of rivers (see: *Down To Earth*, Vol 11, No 13, November 30, 2002). Prabhu is the chairperson of the Task Force on Inter-linking of Rivers.

AASU is threatening to launch a mass movement to oppose the Union government's move. According to its president, Prabin Boro, a delegation would visit New Delhi next month to put pressure on the government to withdraw the plan. In this regard talks may be held with officials of the Union water resources ministry and the Union home ministry, revealed Boro.

ENCROACHMENT DETAILS: A division bench of the Kerala High Court has granted four weeks' time to the state government to furnish the list of people who were found to have encroached on forestland after January 1, 1977, and were evicted thereupon. The list will also contain names of those who had been evicted in the past one year (see: *Down To Earth*, Vol 11, No 20, March 15, 2003). A bench comprising Chief Justice J L Gupta and Justice A K Basheer issued the directions in a public interest litigation petition filed by Nature Lovers Movement, Thiruvankulam. The group was seeking eviction of encroachers on forestland prior to January 1, 1977.

Decks cleared

For emissions trading in EU

AFTER three years of debate, the world's first international market to sell and purchase greenhouse gas (GHG) emissions is finally being put in place. The European parliament has agreed to trade in emissions within the bloc and the Council of Ministers has given its final seal of approval.

The EU members will present

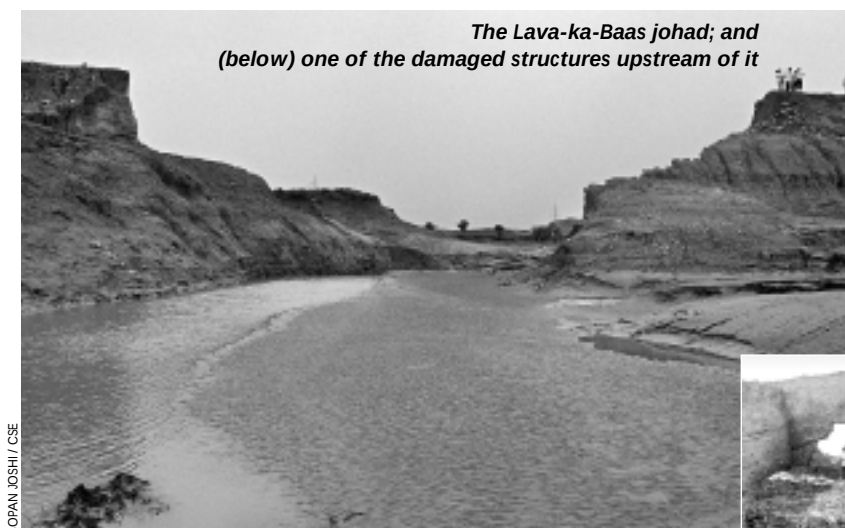
national plans to distribute emissions rights to the 10,000 industries involved by March 2004. As a result, about 12,000-15,000 companies will have to accept constraints on allowable emissions levels. Once caps on industries' GHG emissions are decided, trading will begin on January 1, 2005.

Each country's government will give out at least 95 per cent of allowances to emit free of charge but may choose to auction the rest. The allowances will have a monetary value enabling companies that reduce their emissions to sell excess credits to firms that are emitting

more than their allotted share.

Most industries are from the energy supply sector, which also had the largest share in EU emissions — 1270 million tonnes of carbon dioxide equivalent (mtCO₂e) or about 38 per cent of EU's total carbon dioxide emissions — in 1990. Using a carbon price of 8 US \$/tCO₂e, the total value of allowances to be managed by the EU energy industries would amount to some US \$10 billion per year. The emissions trading scheme is one of the ways of reducing GHG emissions by the EU as required under the Kyoto Protocol. ■

The Lava-ka-Baas johad; and (below) one of the damaged structures upstream of it



check-dams, breaking them one after another. The water then gushed in torrents towards the Lava-ka-Baas johad and breached it straight down the middle.

The people of the village allege that the new johads were not structurally sound. Various officials, speaking on the condition of anonymity, concede that the check-dams were not up to the mark. Pramod Kumar Agrawal, executive engineer in the state irrigation department, however, maintains that the Lava-ka-Baas johad is illegal — a violation of the Irrigation and Drainage Act of 1954. In 2001, the state government had even passed an order to pull down the johad. The Centre for Science and Environment, New Delhi, had taken a team of experts to study the structure. While the Lava-

ka-Baas johad was found safe under normal conditions, some measures were suggested to ensure the structure's safety in case of unprecedented rainfall.

TBS and the villagers were trying to implement some of these measures on June 8, 2003. But irrigation department engineers complained to the police, saying the structure could not be altered as there was a writ petition pending on the matter in the Rajasthan High Court. TBS feels that if it had been allowed to strengthen the structure, there was every chance of its withstanding the July 10 deluge. The organisation also points out that the Samra Sagar dam, built in 2002 by the irrigation department in Pratapgarh tehsil at a cost of about Rs 1 crore, got breached right after the first monsoon showers on June 19. ■

Split wide open

Officials, experts differ on cause of check-dam breach

SOPAN JOSHI Alwar (Rajasthan)

IN THE wee hours of July 10, the johad (earthen check-dam) in Rajasthan's Lava-ka-Baas village, which had irrigated at least seven villages during two successive droughts, burst. The water that flowed fiercely through the embankment saw the villagers' hopes being washed away. They had constructed the structure in 2001 in the face of strong objection by the government. The irrigation department and political leaders opposed the johad saying they had always questioned its safety and legality. The village, however, blames the shoddy johads built by the panchayats upstream of Lava-ka-Baas.

The johad was one of more than 7,000 check-dams built in the area with the guidance of Tarun Bharat Sangh (TBS), a voluntary body. Such structures, big and small, have transformed the region's economy over two decades.

Lava-ka-Baas is in Thanagazi tehsil of Alwar district. The tehsil office recorded 95 millimetres (mm) of rain from the night of July 9 to the next morning. Officials point out that the downpour was much heavier in the villages, and that most of it fell inside two hours. The water got accumulated in johads built upstream this summer by the Panchayat Samiti as part of drought-relief works. The sudden rise in the volume of water had a ripple effect on these

Under the scanner



Gearing up

Sri Lanka mulls roadmap to combat air pollution

TAKING cognisance of the spiralling emission levels, Sri Lanka has recently drafted a national policy which aims to improve the country's air quality. The policy planning division of Sri Lanka's ministry of environment and natural resources has already swung into action, purchasing two gas analysers and one smoke metre for air quality monitoring.

According to the United States-Asia Environmental Partnership Programme, degradation of urban air quality in Sri Lanka is a major cause for concern. The situation in Colombo and other major cities is bleak, primarily due to mobile emissions. The Colombo Metropolitan Area accounts for 60 per cent of all vehicles. With the exception

of sulphur dioxide, the transport sector is the biggest contributor of air pollutants.

The United Nations Environment Programme (UNEP) Regional Resource Centre for Asia — Pacific-Male Declaration Baseline Information has found that over the past few years the number of vehicles in the capital has increased by an average of 6 per cent annually. The centre also points out that there has been an alarming rise in the use of diesel.

To be sure, the authorities do appear to be taking remedial measures. The government's Gazette notification lists a new fuel quality standard which came into effect from January 1, 2003. Earlier the Clean Air 2000 Action Plan developed in 1992 identified the phasing out of lead as one of the activities. The Ceylon Petroleum Corporation made "unleaded gasoline available island-wide in May 2002". That apart, the environment ministry has devised a clean air 2005 action plan to minimise the country's air pollution to great extent. Notwithstanding these efforts, Sri Lanka still has miles to go. ■

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Switchover jitters

HC order on stricter emission norms catches Kolkata off guard

SATARUPA JOARDAR *Kolkata*

ON MARCH 28, 2003, the Calcutta High Court passed an order which, if implemented, would make Kolkata the country's only city with 100 per cent Bharat Stage-II compliance (equivalent to Euro-II). The court ruled: "All vehicles, be it private or commercial, operating in the Kolkata Metropolitan Area (KMA) have to comply with Bharat Stage-II auto emission norms by April 2004." At present only new vehicles are required to meet Euro-II standards.

Not surprisingly, state transport minister Subhas Chakraborty has now decided to seek more time to fall in line.

"It is humanly impossible to change the engines of 15 lakh vehicles in such a short span. It would also cost about Rs 25,000 crore," claimed Chakraborty. In fact, broaching the issue at a conference in Agra (Uttar Pradesh), he averred: "The court should intervene only if the motor vehicles act is violated." Transporters too will move court to get the time-schedule extended.

The April 2004 deadline may be missed because modifying the vehicles' engines would be a prohibitive affair and fitting emission-control devices will at best be a temporary solution. ■

With inputs from Chirag Shah in Delhi

Testing time

In Karnataka, a lesson in water scarcity

E VIJAYALAKSHMI *Bangalore*

A SEVERE water crisis spawning an acute shortage of textbooks? Strange but true.

Karnataka's school students recently became unsuspecting victims amid this bizarre turn of events. It so transpired that the Mysore Paper Mills (MPM) stopped functioning as its water supply was disrupted due to the drying up of Bhadra river. A lorry strike in April compounded the problem by slowing down the movement of paper consignments to printers and publishers. Consequently, textbooks were unavailable in the market till as late as June.

The government-owned MPM is located along the river in Shimoga district. A six-year-old regulation stipulates that the designated printers and publishers should source raw material only from MPM. The unit supplies

about 15,000 metric tonnes of paper every year for printing textbooks.

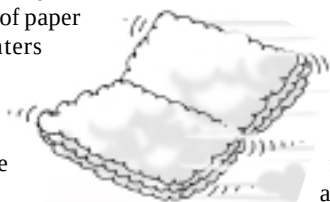
According to industry sources, production at the facility came down to about 30 tonnes per day as opposed to the maximum capacity of 350 tonnes. MPM is said to have ceased operations for a few days in April. When textbooks didn't reach the market even by May, students and parents panicked.

Another rule — that Karnataka syllabus textbooks cannot be printed outside the state — prevented an early resolution of the problem. "This helps safeguard Kannada culture," reveals Jagannath Rao, director, department of state educational research & training.

Rao blames MPM for not drawing up contingency plans. MPM, however,

claims that the entire incident has been blown out of proportion. "Our operations were affected for only a couple of days," asserts S M Fathallah,

director, marketing, of MPM. Tamil Nadu too was faced with a similar situation. Water shortage in the Mettur reservoir forced the Tamil Nadu Newsprint and Paper Limited to shut down one of its machines temporarily. ■



EMKAY

TAKE NOTE

The Rajasthan government has transferred to Panchayati Raj institutions the power to control and manage the Public Distribution System (PDS) in rural areas. The development officers of all Panchayat Samitis now have the power to issue authorisation letters to fair price shops and cancel them if their terms and conditions have been violated. The shops will be required to submit records of receipts and distribution of foodgrains to village panchayats. Up to 237 inspectors will be appointed in Zila Parishads to monitor the implementation of this decision.

I N S H O R T

► **GREEN LIGHT GIVEN:** The Central Electricity Authority has granted the final techno-economic clearance (TEC) to the North-Eastern Electric Power Corporation (NEEPCO) to execute the 1500-megawatt Tipaimukh Hydro Electric Project. The Rs 5163.86-crore venture was cleared after Mizoram granted a no-objection certificate. Manipur too fell in line earlier. The six-phase project — sited downstream of the confluence of Tuivai and Barak rivers on Manipur's contiguous border with Mizoram — is slated for completion in 2011.

► **NATIVES RESTIVE:** Aborigines are protesting the Australian government's recent decision to "compulsorily acquire" an area in the south Australian desert for the construction of the National Low Level Radioactive Waste Repository. They say that radioactivity will contaminate groundwater.

► **AFFLICTION IDENTIFIED:** The sudden outbreak, which resulted in the death of around 112 children and affected another 196 in Andhra Pradesh, has been diagnosed as viral meningoencephalitis or brain fever. The disease spreads through mosquitoes. Similar cases have been reported from Maharashtra and Himachal Pradesh.

► **DAMAGE CONTROL:** Canada's agriculture minister Lyle Vancilief and health minister Anne McLellan have announced a new measure to enhance food safety controls for bovine spongiform encephalopathy (BSE), commonly known as mad cow disease. It requires tissues, which could contain the disease-transmitting agent, to be removed from cattle at slaughter. The discovery of a single cow infected with the fatal disease in May has halted all sales of Canadian beef to the US.

ENVIRONMENTAL SCIENCES

Climate has changed

Admits the World Meteorological Organization

A TINY kingdom of subsistence farmers in Africa is hungrier than ever. In January 2003, rainfall patterns of Lesotho altered suddenly, ushering in untimely frost and severe storms that destroyed most of the standing crops. "Frost in the summertime! We never used to see weather like this. We don't know what to expect anymore from the skies. I think God is angry with us, but I don't know why," says Makhabasha Ntaote, a 70-year-old matriarch.

Scientists have a possible answer to Ntaote's question. They predict that nearly a third of Lesotho's 2.1 million residents will soon require aid, as the mainstay of their economy suffers the impacts of global warming. According to the World Meteorological Organization (WMO), this year the impacts

would be more apparent than ever before worldwide in the form of extreme weather events.

The specialised climate science agency of the United Nations normally confines itself to issuing scientific reports and statistics at the end of each year. However, the extreme oddities of weather patterns this year compelled the organisation to issue a warning recently. Already, a pre-monsoon heat wave in India has resulted in temperatures over 45°C (2-5°C above the normal), killing at least 1,400 people. In Sri Lanka, heavy rainfall resulting from a tropical cyclone exacerbated wet conditions from May onwards, leading to flooding and landslides that killed at least 300 people. In January, Fiji suffered the impacts of its worst cyclone since 1987.

Industrialised countries have not fared any better. At least 562 tornadoes hit the US in May, killing 40 people. The is much higher than the previous monthly peak of 399 storms recorded during 1992. In June, some places of southern France experienced temperatures above 40°C (5-7°C more than the long-term average). Switzerland witnessed its hottest June in the past 250 years — daytime temperatures have not fallen below 25°C in Geneva since May 29, making it the warmest June ever recorded. This June was also the hottest in England and Wales since 1976, with average temperatures being 16°C.

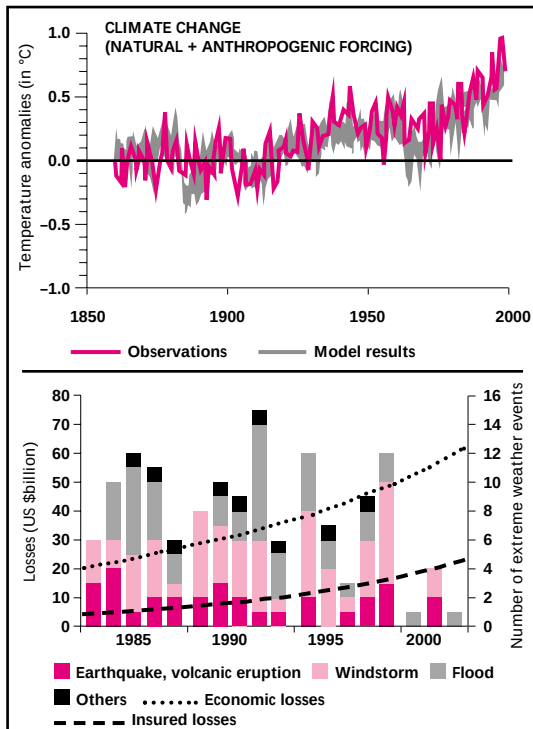
None of these events are truly remarkable when considered individually. But together they represent a clear and alarming trend towards wilder weather conditions. "These extreme events all go into calculating the monthly and annual averages which, for temperatures, have been



BOB MC MILLAN / FEMA

EXTREME EVENTS

are becoming more intense, causing more losses



Source: 1. *Natural catastrophes in 2002, Annual Review: Natural catastrophes in 2002*, Münchener Rück.
2. *Climate Change 2001: Synthesis Report*, Intergovernmental Panel on Climate Change, Cambridge University Press, UK, 2001

gradually increasing over the past 100 years," says Kenneth D Davidson, director of the World Climate Programme, WMO. According to recent reports of the Intergovernmental Panel on Climate Change, the global average surface temperature over the 20th century has increased by around 0.60°C. This value is about 0.15°C more than the previous estimates. Global average land and sea surface temperatures in May 2003 were the second highest since 1880. "Soon 2003 may be the hottest year ever recorded," asserts Davidson.

To date, the 10 hottest years in the 143-year-old global temperature record have all been after the 1990, with the three hottest being 1998, 2002 and 2001. Extreme weather events also increased during this period — there were 63 weather-related disaster declarations in 1998, far more than the average 21.7 disaster announcements made per year during the 1980s. For instance, there were 26 flood disasters worldwide in the 1990s, but just 21.7 per year during the

1980s. The frequency and intensity of extreme weather increases due to a change in the distribution of heat, which disrupts the flow of energy through the climate system, altering the circulation patterns of the atmosphere and oceans, and modifying the Earth's hydrologic cycle. Higher temperatures also increase evaporation and transpiration, and raise the air's capacity to hold moisture, making more of it available to fall as rain and snow.

With the weather becoming unpredictable, both human casualties and economic losses have increased over the years. In the 1980s, the world's property insurers lost an average of US \$2 billion

FUTURE TENSE

Heat waves to kill more people in US

US cities	Current deaths	Deaths in 2020*	Deaths in 2050*
Buffalo	33	34.3	55.3
Chicago	191	400.7	497.3
Cleveland	29	39.0	52.3
Detroit	110	162.7	219.0
Minneapolis	59	129.3	174.7
Pittsburgh	39	54	79.7
St Louis	79	160	185.3

*Numbers derived from averages of three models — United Kingdom Meteorological Model, Global Fluid Dynamics Laboratory Model and Max Planck Institute for Meteorology Model. Population and metropolitan areas standardised to current levels.

Source: www.sierraclub.org, as viewed on July 14, 2003.

annually to extreme weather events. But in the 1990s, losses exceeded US \$12 billion annually. For just the first 10 months of 1998, weather-related expenses (US \$89 billion) far exceed the losses for the entire decade of the 1980s.

Poor nations tend to suffer far more than wealthier ones — while flooding in Mozambique cut the country's gross domestic product (GDP) by 45 per cent in 2000, floods of the same scale in Germany last year were blamed for just a one per cent decline in the nation's GDP. Hopefully, WMO's warning will help save numerous lives and minimise losses worth billion of dollars this year. ■

ENVIRONMENTAL SCIENCES

Well wishing

Deeper wells are free of arsenic

DB MANISHA

ARSENIC tainted well water could be killing 3,000 people each year in Bangladesh; digging some wells deeper could save 70 per cent of the victims. These are the findings of a study by geochemists from the US-based Massachusetts Institute of Technology (MIT). "Hardly any reliable data exist about the impacts of arsenic. Therefore, we wanted to at least have a rough picture of how bad the situation is," says Charles Harvey, the lead author of the controversial study.

Arsenic was traced in the aquifers of Bangladesh and West Bengal during the early 1990s, after villagers developed cancerous skin lesions. Today the problem has assumed lethal proportions, and public health experts describe it as "the worst mass poisoning in the history of the world" (see 'The dark zone', *Down To Earth*, Vol 11, No 22, April 15, 2003).

To predict the possible magnitude of the crisis, Harvey's team built a statistical model. The researchers used a detailed map of the country's geology, prepared by the British Geological

Survey during the late 1990s, to approximate the arsenic concentration in the country's wells, and the probable number of villagers using them. With the help of this data, the researchers simulated the health effects of the contaminated water. The exercise was complicated by the fact that arsenic concentrations vary greatly over time and distances. Wells in the same village can have wildly different levels of the chemical.

The results were appalling: at least 125,000 cases of skin cancer could occur annually, the researchers found. The

Dig boy dig, but don't hope for clean water



DAVID CLARK

model also simulated the impact of interventions aimed at reducing the contamination. "The depths of wells seem to play a major role," asserts Harvey. The observation is supported up by a recent analysis that linked arsenic levels in 6,000 wells with their location and depth. It indicates that shallower wells in certain geological areas of Bangladesh have very high levels of arsenic. Around 30 per cent of the wells analysed by researchers of MIT are located in these areas.

However, some experts are not convinced. "One cannot make a general statement in a complex issue like arsenic. One has to look at the soil composition — whether there is clay or sand, and depending on that one can make a conclusion such as this. Let alone for the rest of the world, the findings do not even hold true for the whole of Bangladesh, as they are site specific," says Subhashish Sengupta, director of arsenic project, Geological Survey of India, Kolkata. "The study says nothing new. Deeper layers were free of arsenic in the past. But due to constant digging, the harmful chemical has now leached into these layers from the middle strata of the Earth," says S K Acharyya, professor, department of geological sciences, Jadavpur University, Kolkata. He says it is economically unviable for the poor people to dig deeper wells. "At present, dugwells are one of the best ways out," he asserts. ■

PHYSICAL SCIENCES

Theory of alienation

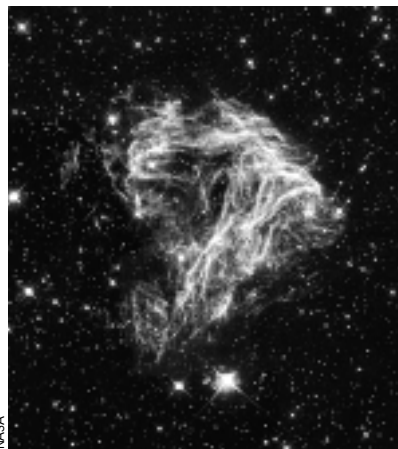
Cosmos governs Earth's climate, claim studies

A NEW report may be just another lame attempt to defend the US stance on global warming. As per its findings, the impact of cosmic rays on our climate far outweighs that of carbon dioxide. "It's no excuse to ignore sensible resource use, but the bottom line is that carbon dioxide is not a bad boy," asserts Nir Shaviv, one of the report's authors who is a physicist at the Hebrew University, Israel. The suggestion has but naturally met with scepticism: "I don't buy it," says Wallace Broecker, a climate change expert of Columbia University, USA.

Shaviv and climatologist Ján Veizer of Ruhr University, Germany, aver that cosmic rays emitted by dying stars in the dust-rich arms of the Milky Way increase the number of charged particles in the Earth's atmosphere after every 150 million years. This encourages low level clouds to form, which cool the Earth. Shaviv and Veizer created a mathematical model of the number of cosmic rays hitting the Earth's atmosphere, and then compared its results with the estimates of global temperatures and carbon dioxide levels of the past 500 million years.

They concluded that cosmic rays alone can account for 75 per cent of the

change in global climate during the period, and less than half of the global warming seen since the beginning of the 20th century is due to greenhouse gases. The links are tenuous, others counter. Palaeontologist Paul Olsen, also of Columbia University, warns that Shaviv's study shows only a correlation between temperature levels (as inferred from ancient sediment records), carbon dioxide concentration (calculated with the help of fossilised sea shells) and intensity of cosmic rays (as derived from meteorite records). All three factors are



Cosmic rays didn't start the fire

open to interpretation. Moreover, one of the 'cool' periods of the researchers' mathematical reconstruction is said to be a warm phase.

Barring the endless loopholes, the study adds a new dimension to the hypothesis of outer space causing a detectable cooling of the Earth's surface. Long ago some astronomers had asserted that massive loads of stardust can trigger extreme and long lasting ice ages. In fact, researchers have recently found that the amount of stardust penetrating our solar system has tripled in the last few years. Until now, astronomers knew little about cosmic dust arriving from sources other than the planets' orbits called ecliptics. The launch of Ulysses satellite in 2000 widened their horizons. After analysing Ulysses' data from 2002 to 1992, Marcus Landgraf of the Germany-based European Space Operations Centre found that the level of stardust is on the increase, and the rise coincides with changes in the Sun's activity. From 2000 to 2002, a period when Sun's energy was intense, the levels of stardust were three times more than the preceding three years.

The variation is due to the way the Sun's changing magnetic field interacts with the charged dust particles. At solar maximum, the field switches polarity, leaving a jumble of magnetic lines that allow the stardust to flow unimpeded throughout the solar system. But at solar minimum, the well-defined magnetic poles confine the dust. ■

HEALTH & MEDICINE

A sure shot

Hepatitis B vaccine should not be administered to all children

VIBHA VARSHNEY

A RECENT study may intensify the ongoing controversy about the inclusion of hepatitis B vaccine in India's universal immunisation programme (UIP). The study shows that vaccinating only children born to hepatitis B-positive mothers is 19 times cheaper than immunising all kids. Since the main mode of transmission of the hepatitis B virus is from mother to child, the inclusion of the

vaccine in UIP is quite redundant, the study goes on to assert.

Around three to seven per cent of India's total population is affected by the disease, which damages the liver. According to the New Delhi-based Indian Council of Medical Research, 5,000 people die annually due to liver cancer caused by the hepatitis B virus. The authorities are, therefore, contemplating about vaccinating all six-week-old children against hepatitis B under the UIP.

Some experts say the vaccine is effective only if administered during the first 48 hours of birth; but in India this is not possible as 65 per cent of babies born each year are delivered at home. Therefore, the inclusion of the vaccine in UIP will not work wonders. The new

study lends force to the argument. It was conducted in the Sangam Vihar area of New Delhi by Plan India, a non-governmental organisation based in the city.

A total of 1,100 deliveries took place in the locality during the study period of one year. Out of the 987 mothers tested prior to their deliveries, 22 were found to be hepatitis B-positive. The researchers vaccinated their children as soon as they were born. The rest of the children were not immunised.

To find out how cost-effective their approach is, the researchers simulated the expenditure of their method as well as that of vaccinating all the 1,100 children. While doing so, they assumed their method was being adhered to for a long time; therefore out of the 987 mothers who took part in the study,

only 250 needed to be screened, as they were expecting their first child. The rest would have been tested when they had their first child.

The researchers' calculations show that if the cost of testing the mothers is Rs 30 and the price of the hepatitis B vaccine is Rs 70 per dose, then protecting a community of 65,000 people through selective immunisation will mean incurring an expense of Rs 12,120, but for universal vaccination the expenditure will be Rs 231,000. Selective vaccination is cost effective even when overheads such as cost of refrigeration, needles and syringes are considered.

The group further estimates that the cost of lives saved through selective vaccination would be Rs 309,800 per individual as compared to Rs 968,000 per person through universal vaccination.

To take a final decision about the inclusion, the government is waiting for the results of a pilot project, whereby the vaccine has been included in the UIP of a few areas. However, funds to make it a part of UIP have already been allocated under the 10th five-year plan. ■

PHYSICAL SCIENCES

WATER PROOF

Mars may support life

The Martian North Pole is honeycombed with frozen water. These are the findings of a us-Russian team of scientists, who recently analysed data of the Mars Global Surveyor and Mars Odyssey, two nasa satellites.

The discovery is good news for those who believe life might have been present on Mars in the past, since liquid water is a prerequisite for the development of Earth-type life forms.

Last year the Mars Odyssey had detected subsurface ice around the Martian South Pole. But the ice on the northern polar region scientists is about one-third more than that found in the southern region of the planet.

Image of ice on Martian North Pole



NASA



Checkpoint: US Farmers are not growing non-Bt varieties of maize

AGRICULTURAL SCIENCES

Give refuge

Else, Bt may become ineffective

NEARLY one-fifth of the farmers in the US midwest are ignoring federal rules about how much transgenic maize they should plant, indicates a recent study. Experts fear this non-compliance could encourage pests to develop resistance to the insecticide produced by the crop.

Some transgenic maize contains a gene from the bacterium *Bacillus thuringiensis* (Bt), which allows the corn to produce a natural insecticide. Under rules laid down by the US Environmental Protection Agency (EPA), farmers who plant Bt maize must devote 20 per cent of their acreage to non-Bt varieties. The 'refuge' prevents pests from developing resistance to the insecticide — resistant insects breed with their susceptible counterparts living in the 'refuge' areas and the 'resistant traits' gets diluted in the next generation.

A study released by the Centre for Science in the Public Interest (CSPI), a Washington DC-based pressure group, reveals the rule is being ignored. The report cites data of the US department of agriculture. It shows that during the last year, 19 per cent of all Bt maize growing farms in the states of Iowa, Minnesota and Nebraska failed to take the necessary refuge. No refuge was planted at all on 13 per cent of the farms. Most people ignoring the rules had small farms (covering an area of about 80 hectares). The defiance may stem from the fact that the

Agricultural Biotechnology Stewardship Technical Committee, the industry's body monitoring growing practices, does not supervise small farms.

"It's just a matter of time before resistance develops," warns Gregory Jaffe, the report's author. Bt maize will be rendered useless, adds Jaffe, if pests such as the European corn borer — the chief target of transgenic maize — develop resistance. But firms manufacturing transgenic crops disagree. "This won't jeopardise the long-term effectiveness of the technology," says Eric Sachs, director of scientific affairs at the biotechnology giant Monsanto. "It's not clear that we have a problem of biological significance, but we do have a problem of regulatory importance," says Val Giddings, vice-president for food and agriculture with the US Biotechnology Industry Organisation. ■

HEALTH & MEDICINE

Root out SARS

Mulethi affects coronavirus

It's probably sitting forgotten on your drug shelf as a dusty bunch of darkish roots, but is the miracle cure. Researchers have found that root extracts of *mulethi* (*Glycyrrhiza glabra*) can adversely affect the replication of coronavirus that causes the Severe Acute Respiratory Syndrome (SARS). The finding provides a boost to India's traditional wisdom.

During their experiments, researchers from Germany-based

Institute of Medical Virology and the Frankfurt University Medical School found that glycyrrhizin, the active ingredient of *mulethi*, is more effective against the virus than other antivirals such as ribavirin and mycophenolic. The researchers observed the effects of all the chemicals on kidney cells of monkeys infected with coronavirus.

They found that along with affecting the virus replication, glycyrrhizin also makes it difficult for the virus to attach and penetrate the cells. In cell cultures treated with 1,000 milligrammes per

litre (mg/l) of glycyrrhizin, the production of viral proteins was inhibited; at a concentration of 4,000 mg/l, glycyrrhizin blocked the virus replication.

The researchers are unclear about the how glycyrrhizin affects the virus. It has previously been used against HIV and hepatitis C virus; but side-effects such as high blood pressure were reported among some patients after several months of treatment. Experts say the problem will not arise in the case of SARS, as the treatment will be required for a short duration. ■

LIFE SCIENCES

Live & let live

Revolutionary medicine tested

BACTERIA have been genetically modified to act as drugs within human bodies. The organisms are designed to treat inflammatory bowel disease by producing a human immune protein that dampens inflammation. GM bacteria are widely used to make food and drugs; but the prospect of drug-producing gut bugs getting into the wrong people or swapping genes with other bacteria has been the concern of many. To address such fears, the bugs have now been altered so that they die within days when discharged into the environment along with faeces.



Lactococcus lactis

Lothar Steidler prepares the living drug

For now, the 12 patients at the Academic Medical Centre, Holland, who have been administered the bacteria, are being kept in isolation. "They can't go out, and all their faeces are collected and then destroyed," says Lothar Steidler, a scientist at the UK-based University of Cork, who heads the group pioneering the therapy.

Steidler's team chose the *Lactococcus lactis* bacterium because tonnes of it are already consumed in dairy products such as cheese. But rather than simply adding an extra gene to the bacterium, a gene producing the human immune protein (interleukin-10) was used to replace a key bacterial gene called the *thyA*. This codes for the enzyme needed to make thymidine, one of the building blocks of the bacterium's DNA.

In the gut, thymidine is released as food is digested; therefore the modified bugs can flourish there even though they cannot make the enzyme. But outside the gut, where there is little thymidine available, the bacteria die, as Steidler's team has shown in experiments on mice and pigs. It is also highly unlikely that the bacterium will acquire a copy of *thyA* from other bacteria, as the gene is found on the main bacterial chromosome, rather than one of the smaller pieces of DNA called plasmids that bacteria swap freely.

Patients take the bacteria as a coated pill that protects the bugs in the stomach till it breaks open and ejects its live cargo in the small intestine and colon. But it remains to be seen if the treatment will work or not — there is no way to control the distribution of the bacteria within the gut, or how much interleukin-10 is produced, says Joel Weinstock of the US-based University of Iowa. ■

ENVIRONMENTAL SCIENCES

La Niña flees

Indian monsoon may lose out

THE chances of 2003 being a La Niña year have become remote, if scientists are to be believed. This is a big disappointment for India, as the phenomenon of the unusual upwelling of cool waters in the equatorial Pacific Ocean is associated with heavy monsoons in the country. Since 1901, all the 18 La Niña years with the exception of one have been marked by heavy rainfall all across the country.

A cooling was evident in the eastern equatorial Pacific since January this year, raising the hopes of a La Niña event, but the trend has reversed since early June. "It stopped mid-way," says M Rajeevan, director of long-range forecasting of the India Meteorological Department (IMD), Pune.

A key element in monitoring La Niña is the sub-surface temperature gradient in the Pacific Ocean. The surface water of the ocean is usually warm and the deeper water cold. In between exists a narrow band, called the thermocline, where temperatures fall rapidly. As a La Niña develops, the thermocline becomes shallower, due to an upward surge of cool water.

Negative sea-surface temperature anomalies (read: cooling) have weakened across the central and eastern equatorial Pacific during June, resulting in near normal thermocline in all La Niña regions. A notice circulated by the US-based Climate Prediction Centre as latest as July 10, 2003, said that current atmospheric and oceanic conditions do not support the development of La Niña in the next few months. Several atmospheric indices linked to La Niña such as Southern Oscillation Index, which is derived from the pressure differences at Tahiti and Darwin (Australia), also do not support its development.

The dim chances of a La Niña year have prompted IMD to be cautious while updating its southwest monsoon forecast in July 2003. However, it asserts that this year's rainfall is going to be 98 per cent of the long period average of 88 centimetres, rather than the 96 per cent predicted in April 2003. ■

Order without science

Ignorance of expert opinion makes the judicial system biased

ON JUNE 28, 1993, the Supreme Court of the US passed a verdict that tilted the scales of justice in favour of polluters by undermining the role of science in the country's judicial arena. This fact was made public during a recent press conference of the Tellus Institute, a Boston-based non-governmental organisation. The ruling, which emerged from the case of *Daubert vs Merrell-Dow*, endowed judges with the power to decide whether to allow expert testimony into the courtrooms or not. The decree was criticised on the grounds of turning judges into amateur scientists.

Families of two children with minor birth defects filed the *Daubert* case against the manufacturer of the anti-nausea drug *Bendectin*. In its 7-2 ruling in favour of the manufacturer, the Supreme Court set up four criteria to determine the credibility of science as evidence — is the expert opinion based on a testable theory or technique; has the theory or technique been peer reviewed; does the technique have a known error rate; and is the underlying science generally acceptable? The judges were even permitted to use standards of their own. Two later cases — *General Electric vs Joiner* and *Kumho Tire Corporation vs Carmichael* — expanded on the judgement. In *Joiner*, the court ruled that appellate courts should not overturn the admissibility decision of a trial court unless the trial court

abused its discretion. In *Kumho*, it clarified that the *Daubert* ruling is applicable to all expert testimonies, including those based on experience.

Prior to the ruling, the jury (instead of the judges) ascertained the credibility of 'expert evidence' on the basis of two standards — relevance, and whether the methods used by experts were generally accepted within the scientific community. "The shift violated the essential core of one's right to a jury trial," asserts Stanley Feldman, former chief justice of the Arizona Supreme Court. Furthermore, it allowed lawyers and judges to demand certainty from science that is not in tandem with what the law would require usually. "It is in particular troubling for toxic tort cases, where a plaintiff relies on scientific experts to demonstrate causality," asserts Margaret Berger, a professor at the Brooklyn Law School, USA. With so much unknown about the toxicity of a vast array of chemicals, it is very rare for

scientists to arrive at definitive conclusions. The ruling allows defendants to exploit this uncertainty to toss out scientific evidence. A good example is the case of a contractor from Exxon Corporation's oil refinery, who supposedly developed chronic myelogenous leukaemia after being exposed to benzene. Peter Infante, former director of the Office of Standards Review at the US Department of Labour's Occupational Safety and Health Administration, was supposed to testify. As the author of a 1977 study that confirmed benzene as a cause of leukaemia, Infante seemed to be a qualified expert. But the judge excluded his testimony on the grounds of there being a limited scope of studies about workers exposed to benzene.

So far some 20 states of the US have adopted the *Daubert* ruling. Critics assert that it is also leading to biased policy formation. In this context, some cite the 2001 Federal Data Quality Act, which provides concerned parties with a formal administrative mechanism to challenge the science used by federal regulatory agencies. A chemical lobby recently challenged the US Environmental Protection Agency's right to include peer-reviewed studies documenting endocrine disruption effects in its risk assessment of the herbicide atrazine. Last year, the US Chamber of Commerce had even urged the government to adopt the *Daubert* standards in the regulatory process. ■

A chemical lobby has challenged the US Environmental Protection Agency's right to include studies documenting endocrine disruption effects in risk assessment of the herbicide atrazine

RULE OF THUMB *But only for the poor lot of India*

The Indian Law of Evidence states: When the court has to form an opinion upon a point of...science...the opinions...of persons specially skilled in science...are relevant facts. "However, the advice given by well-known experts/institutes are only able to convince the judiciary," says Videh Upadhyay, partner, Enviro Legal Defence Firms, New Delhi. Most people are unable to sought help from the 'credible' experts. "Even if they can, expert advice gets lost during cross-examination. Committees of the government or courts are valued generally," says Rajiv Dhawan, a senior advocate of the Supreme Court.

"A judgement based on science"

- In 2001, a trustee of Wildlife First files petition about mining in Kudremukh National Park by Kudremukh Iron Ore Company Limited (KIOCL)
- In 2002, findings of detailed studies on the adverse impacts of mining are presented in the Supreme Court. KIOCL does not challenge the studies
- The court forwards the findings to the Central Empowered Committee, which makes them the basis of its recommendations. In 2002, following the committee's proposals, the court rejects the company's plea to mine in Kudremukh but allows it to continue till the end of 2005...

"A judgement based on impression"

- Prolonged struggle of Narmada Bachao Andolan (NBA) forces government to set up a committee to review Sardar Sarovar Project (SSP) dam in 1993; however authorities soon whittle down committee's mandate
- NBA files PIL on SSP in 1994; same year committee submits its report, but it is not made public. As it worked under restrictions, Supreme Court (SC) orders it to re-examine. Thereafter role of experts takes a back seat
- Expert opinion sought by NBA given less importance than committees of court; on October 18, 2000, SC gives a clean chit to the project



THE MEAT YOU EAT

A slaughter of regulations

NIDHI JAMWAL & NEHA DUA

Animal parts strewn all over the place; dogs and vultures preying over these wretched remains; dirt festering all around; horrible stench that makes your innards wrench with revulsion. Check out the meat you eat. For such horrific features are common to most slaughterhouses in the country.

Most abattoirs across the country dispose of their waste in the most hazardous manner, pollute land, air and water and make lives of those living in their immediate vicinity miserable. Residents living in immediate environs of many slaughterhouses in the country often complain of blood trickling out of their taps. State governments have tried out various remedies such as effluent treatment plants (ETP), rendering plants and relocating slaughterhouses. But nothing has worked.

Why is the problem so unmanageable? According to a report published by the New Delhi-based non-governmental organisation (NGO), Vatavaran in 2000 — *A peep into legal and illegal slaughterhouses* — as against 3,600 legal slaughterhouses in the country there are 32,000 illegal ones. And these are conservative figures. Worse still, none checks the quality of meat coming out of these slaughterhouses. “A manager of a well-known slaughterhouse recently told me that even if they find meat unfit for human consumption, they still sell it,” says Laxminarain Modi, managing trustee, Bharatiya Cattle Resource Development Foundation, New Delhi.

Some private slaughterhouses like Mumbai’s Al Kabeer Exports Private Limited show signs of improvement. The

company claims to be using biomethanation to treat waste and utilise energy. But this company is a rare exception.

Filthy Idgah

Unhygienic conditions abound around Idgah — Delhi’s principal slaughterhouse. It is spread over seven acres in the Sadar Bazaar area of the city and around 2500 sheep, goats and buffaloes are slaughtered here everyday. The slaughterhouse gets its livestock from a nearby animal farm. The animals are supposed to undergo a thorough health check up before being slaughtered. “After slaughtering the meat is again checked and stamped by MCD. Only stamped meat can be sold in the market,” informs the manager of Idgah. Health check ups include checking the animals’ general appearance, heart rate, temperature and respiration. The animals are also tested for viral (such as rabies), bacterial (such as anthrax) and paraxial (such as red water) diseases. But admits a local vet, these check ups are cursory. He also complains that Idgah does not have a laboratory to conduct proper testing.

Idgah generates waste amounting to 60-70 tonnes per day (TPD). And it has no effluent treatment plant (ETP) to treat this waste. The Vatavaran study found that as against the permissible slaughtering limit of 2,500 animals, around 8000 animals were butchered in Idgah everyday. The study also showed that there were 15,000 illegal slaughterhouses in Delhi, most of them in the vicinity of the legal one. Another study by the New Delhi-based NGO Centre for Environment Education reported that of a total of 297 TPD of slaughterhouse waste generated everyday in Delhi, 223 TPD is from illegal slaughterhouses. The



waste from these dens of unhygiene is not accounted for and get disposed in nearby by lanes and low lying areas, choking sewer lines and spreading infection.

Will MCD or won't MCD

Pollution from Idgah slaughterhouse is of such an enormous nature that in 1992 a public interest litigation was filed in the Supreme Court of India. Since then many directions have been issued, including shutting down of the slaughterhouse or its relocation to Loni in North Delhi, but nothing much has been achieved so far.

The Municipal Corporation of Delhi (MCD) which owns the Idgah slaughterhouse, has ambitious plans to modernise and mechanise this 100-year old unit and equip it with an ETP and a rendering plant (to make animal feed from waste). Also the livestock market, next to the Idgah, would be shifted to Ghazipur, where another rendering plant of 15 TPD capacity is expected to come up. MCD officials are however completely at sea about this project; different officials have different versions of the plan. For instance, the director of MCD, Rakesh Mehta claims that MCD will be selling the blood of the animals slaughtered at Idgah to pharmaceutical companies. But his fellow officials informed *Down To Earth* (DTE) that there is a ban on such a practise.

Moreover, there are grave doubts on MCD's capacity to modernise Idgah. It is scheduled to be completed by September 2003. But MCD officials admit that there is no way they can keep with the schedule. "It has been years since the Supreme Court directed MCD to modernise Idgah, but nothing has happened. Where is the sanctity of court, when in spite of its strict orders, more than 2,500 animals slaughtered daily at Idgah?" questions Camellia Satija, founder trustee of New Delhi-based NGO, Kindness to Animals and Respect for Environment.

Aligarh's slaughterhouse woes

A DTE correspondent recently visited Aligarh to check its *kattighar* (slaughterhouse). And came back with a gory story. The Aligarh office of Uttar Pradesh Pollution Control Board ordered shutting down of the *kattighar* in November 2002. But the Nagar Nigam Aligarh (NNA) has not yet acted on the order. It has in fact contracted out the slaughterhouse located in Makdoomnagar to a private contractor, who has further sub-contracted it to three butchers and the NNA is not even aware

of this! The municipal body on its part earns Rs 12 lakh per annum from the private contractor.

The three butchers carry out the slaughtering not in the *kattighar* premises but in three private godowns, which have no arrangement for drinking water and are poorly ventilated. "The minimum we expect from NNA is to provide us with drinking water," says a butcher. One butcher slaughters about 70 buffaloes everyday. At least 2,500 buffaloes are slaughtered in these godowns daily and the meat is supplied to various cities such as Aligarh, Khurja, Mathura and even to Delhi.

As per the Uttar Pradesh Nagar Nigam Act, 1955, all animals to be slaughtered have to undergo a health check up. But Aligarh *kattighar* follows no such rules. And NNA officials admit to this. Some of the waste such as hides and wastes are sold to private parties and the rest is dumped as landfill at Makdoomnagar.

If woes inflicted by its legal abattoir was not enough, numerous illegal abattoirs — often housed in individual households — are compounding Aligarh's misery. In colonies, such as Sarai Rahman, almost 80 per cent households slaughter buffaloes. These are two room tenements with a shop in front, where at five in the morning, a buffalo is slaughtered in one of the rooms. According to rough estimates, a buffalo weighs about two quintals and almost 25 per cent of its total body weight becomes waste. Apart from that, one buffalo generates 10 litres of waste blood. All this waste is just washed off into the drain, clogging the sewer lines. "We cannot ban illegal slaughtering till the time we do not provide them with a better abattoir. Our own *kattighar* is in a bad shape," says Savitri Varshney, mayor, Aligarh.

Aligarh's officialdom believes that privatising the *kattighar* will improve matters. "We need a carcass utilisation plant, which will process bones and generate revenue. The animal fat can be sold to companies to make cosmetic cream. But to set up such a plant we require Rs one crore. If the state government provides us with money, we will proceed forward," says B N Dube, assistant municipal commissioner, NNA. Satyendra Misra, municipal commissioner, NNA has already forwarded a proposal for modernisation of the *kattighar* to the state government. "We have invited tenders from private parties for development of the *kattighar*. NNA will only provide the land to the private operator who will take care of the rest" says Misra.

But privatisation is not a sure panacea for all slaughterhouse ills. Take the case of the one owned by Hind Agro

"We cannot ban illegal slaughtering till the time we do not provide them with a better abattoir. Our own *kattighar* is in a bad shape"

SAVITRI VARSHNEY, Mayor, Aligarh



When slaughtering is a daily informal chore that households take up, filth abounds and blood waste clogs drains

Industries Limited at Chherat village near Aligarh. Although the company officials claimed that the wastewater disposed by the slaughterhouse meets all norms prescribed by the Central Pollution Control Board, a completely different picture emerged when DTE correspondent spoke with nearby villagers. Ajit Singh, a resident of Chherat village told DTE, “Sometimes the stench from the *kattighar* is so bad that we cannot eat anything. Chherat drain is dirty and clogged and many times we have seen blood flowing in it. About two years back, four buffaloes from my village drank the drain water and died within two hours. Now we do not allow our cattle to come close to this drain.” The villagers complain that during monsoon, the Chherat drain overflows and dirty water spreads to their fields. Hind Agro officials say that they are setting up a biomethanation plant of 0.5 mega watt capacity, which will convert animal dung and blood into energy and manure. The plant they claim will take care of the villagers’ problems.

Is there a way out

With private slaughterhouses coming up in many cities, things seem to be improving. Some experts claim the private slaugh-

terhouse at Mourigram in Kolkata set up by Fregaerio Conserva Allana Limited in 1999 has provided some respite to the city. The fully mechanised slaughterhouse built at a cost of Rs 80 crore on an area of about 46 acre has a capacity to slaughter 1,500 buffaloes per day. It has an ETP to treat five lakh litres of wastewater per day and a rendering plant to process four tonnes per hour of animal waste. Apart from Kolkata, the company has set up slaughterhouses at Ghaziabad, Agra, Chandigarh, Aurangabad, New Bombay and Zaheerabad (Andhra Pradesh), informs G K Sen, in charge, Fregaerio Conserva Allana Limited, Kolkata.

But residents still complain. “Many a times the ETP does not function as prescribed and the untreated effluent is discharged into the Ganga. The rendering plant is a source of stench,” says B R Pradhan, secretary of Kolkata-based NGO, Mourigram Paribesh Suraksha Committee. Ravikanth, member secretary of West Bengal Pollution Control Board dismisses these complaints as “absolutely baseless”. But according to a news report, in December 2000 in *The Statesman*, there was an ammonia gas leak from the plant, which affected 26 people.

Experts claim that Al Kabeer’s slaughterhouse set up in

The remains of the day at the legal Kattighar of Aligarh



PHOTOGRAPHS: RUHANI KAUR / CSE



From Sarai Rahman, Aligarh: ready to be sold

Medak district of Andhra Pradesh is one of the best slaughterhouses in the country. The plant has a capacity to mechanically slaughter 1,500 animals per day and process about 100 tonnes of meat per day. It has set up a biomethanation plant, which treats 60 tonnes of solid waste per day and generates energy out of it. “This energy is then used to run the refrigeration unit. Apart from energy we also get high quality manure,” says Arshad Siddique, technical director, Al Kabeer, Medak, Andhra Pradesh. The ETP treats wastewater, which is being used for horticulture and pisciculture. “The fact that fish is able to survive in the treated water is proof enough that the water is safe,” adds Siddique (see *Down To Earth*, Vol 11, No 14, December 15, 2002, pp 41-44). Al Kabeer is selling waste products such as hair, hides, tails, horns, etc to generate revenue. The hair is sold to make toothbrushes; hides are salted and shipped to tanneries. So the slaughterhouse is a zero waste unit.

But high water consumption still remains a big problem and the Al Kabeer unit is not immune to it. It consumes about 20 lakh litres per day of water. Hind-Agro officials claim that abattoirs need to use fresh water as they are food-processing units and quality of food is important.

Experts claim that there are technologies to reutilise waste from slaughterhouses — so that it does not harm the environment. Biomethanation is a good way of treating slaughter-

house waste; it not only produces manure, but also generates energy. Since 1994 the Ministry of Non-conventional Energy Sources is running a project — development of high rate biomethanation processes as means of reducing greenhouse gas emissions — to promote biomethanation in the country. It was as part of this project that Al Kabeer has set up a biomethanation plant, and Hind Agro is in the process of setting up another. Ravi Agarwal, coordinator of New Delhi-based NGO Srishti claims that composting is also a good way of dealing with the waste coming out of slaughterhouses. He claims that the process though inexpensive, requires land.

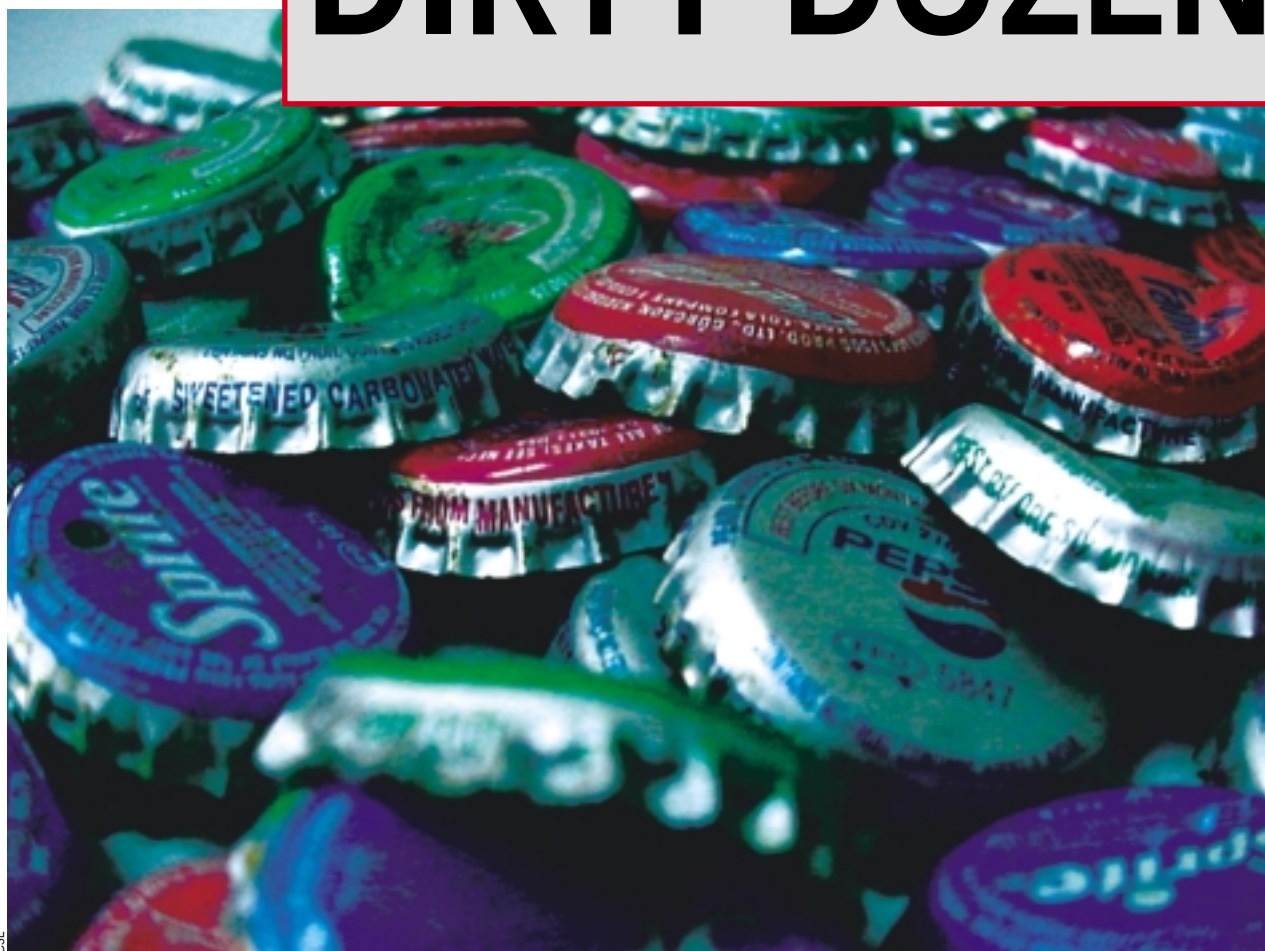
The Union ministry of environment and forests (MOEF) has nothing to say on the slaughterhouse issue. DTE contacted at least four senior officials at the ministry, but everyone was keen to shift responsibility. For instance, the DTE reporter was told that D Bandopadhyay, director, MEF, handles matters relating to slaughterhouse waste, but on contacting him, he was redirected to G V Subrahmaniam, another director at MOEF. Subrahmaniam’s office again directed DTE to contact Bandopadhyay. “There is a lot of confusion about abattoir waste. It is neither municipal solid waste nor biomedical waste nor hazardous waste. It can be categorised as animal waste,” says P M Ansari, Central Pollution Control Board, Delhi. In India we have separate set of rules governing solid waste, hazardous waste, biomedical waste etc — but almost nothing on abattoir waste. It is time the government looks at abattoir waste as a real challenge and not play musical chairs with it. ■

With inputs from Firdous Ali and Radhika Mohan in Medak, Andhra Pradesh

There are no comprehensive rules to govern slaughterhouse waste in India

12 brands of cold drinks put to the test the coolest event of our times. They put to the test the most aggressive, glitzy, gutsy, premium, imaginative, high-quality, expensive and successful attempt to globally grab people's stomach share. As it turns out, Pepsi, Mountain Dew, Diet Pepsi, Mirinda orange, Mirinda lemon, Blue Pepsi, 7-Up, Coca-Cola, Fanta, Limca, Sprite, and Thums Up are . . .

COLANISATION'S DIRTY DOZEN



CSE

The Pollution Monitoring Laboratory (PML) of the Centre for Science and Environment (CSE) places in the public domain its analysis of the contents of 12 cold drink brands sold in Delhi. Three bottles of each of the 12 brands were purchased from markets across the city and analysed to see if they contained pesticides.

PML tested the cold drink samples for 16 organochlorine pesticides, 12 organophosphorus pesticides and 4 synthetic pyrethroids — all of these are commonly used in India as insecticides, in agricultural fields as well as at home



The test found: organochlorine pesticides

LINDANE (γ -HCH): This deadly insecticide damages the body's central nervous system as well as immune system and is a confirmed carcinogen. It was found in 100 per cent of cold drink samples. Its concentration ranged from 0.0008 milligram per litre (mg/l) to 0.0042 mg/l in the samples tested. This last amount is 42 times the 0.0001 mg/l EEC limit — a set of standards stipulated by the European Economic Commission to control contamination in water used as 'food' — for maximum admissible concentration for an individual pesticide. It was found in Mirinda lemon. On an average, lindane concentration in all brands was 0.0021 mg/l, or 21 times higher than the EEC norm.

In the popular Coca-Cola brand lindane concentration was 0.0035 mg/l — a level of concentration which was 35 times higher than the EEC norms.

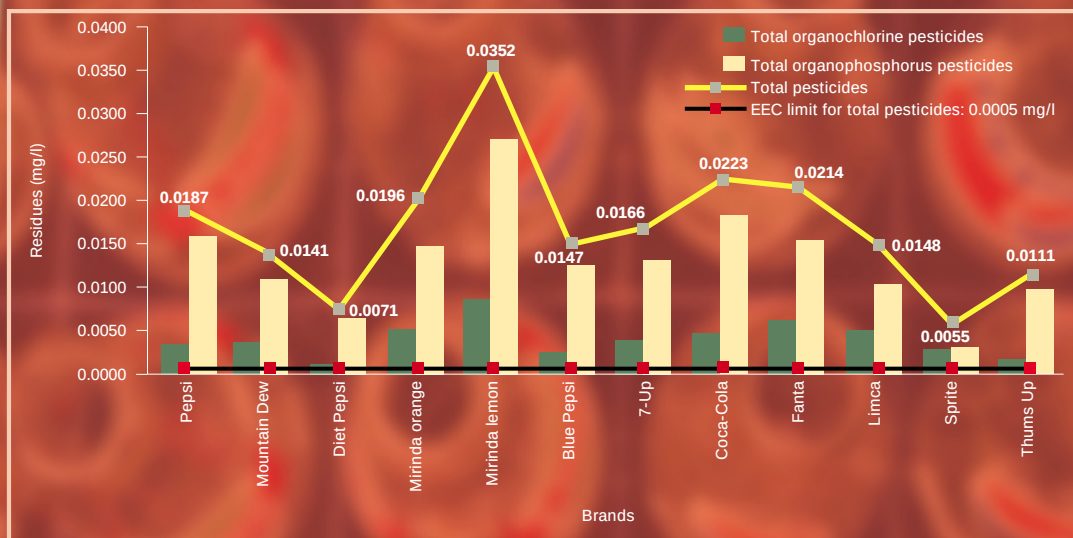
DDT AND ITS METABOLITES (DDD & DDE): Also detected in 81 per cent of the samples. Absent in Diet Pepsi, their concentration is as high as 0.0042 mg/l in Mirinda lemon (42 times higher than EEC norms). On average, total DDT and metabolites found in the samples stood at 0.0015 mg/l, 15 times higher than EEC limits. In the popular Pepsi brand it was 16 times higher than EEC norms. In the equally popular Coca-Cola brand, it was 9 times higher than the EEC limit.

It found: organophosphorus pesticides

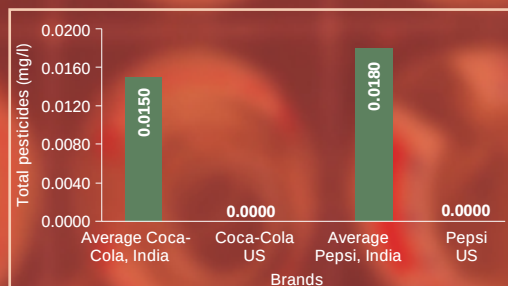
CHLORPYRIFOS: Especially dangerous for mothers-to-be and babies as it is a suspected neuroteratogen (it causes malformations in foetuses), this pesticide was found in 100 per cent of the samples. Maximum concentration was in Mirinda lemon flavour: 0.0072 mg/l, or 72 times more than the EEC single-pesticide norm. The average amount of chlorpyrifos found in all samples was 0.0042 mg/l, 42 times higher than the EEC norm.

MALATHION: Detected in 97 per cent of the samples, its concentration was highest in a Mirinda lemon sample: 0.0196 mg/l, or 196 times the EEC limit for a single pesticide. Coca-Cola had malathion 137 times higher than EEC norms. Malathion gets activated in the human liver to produce malaoxon, deadly for the nervous system. It is also a confirmed mutagen — it can tinker with the body's chromosomal set-up.

In sum, all samples of the 12 brands of cold drinks tested had pesticide residues. ▼



In contrast, PML needed to check if pesticide content was the global norm for the cold drink industry. It decided to procure a sample each of Coca-Cola (The Coca-Cola Company's flagship brand) and Pepsi (PepsiCo's flagship brand) from the US. The bottles were also analysed for the same pesticides, using the same methodology and equipment. PML found nothing. ►►



In brand terms

Two multinationals — Atlanta-headquartered The Coca-Cola Company and New York-based PepsiCo — control the cold drink market in India. Their market share is a fiercely contested secret. They also seem to share a penchant for pesticide residues in their products. Total pesticides in all PepsiCo brands on average was 0.0180 mg/l, 36 times higher than the EEC limit for total pesticides (0.0005 mg/l). Total pesticides in all Coca-Cola brands were 0.0150 mg/l, 30 times more than the same EEC limit.

In conclusion, the pesticides found in soft drinks are odiously similar to bottled water, which the PML had investigated earlier in the year.

Merchanting madira

By the 1990s, the carbonated drinks market in the US and Western Europe was saturated. Companies therefore turned to new ones. So came the fizz to the Middle East, refurbished East Europe and Asia. In 1991, PepsiCo entered the newly liberalised Indian market. 2 years later, Coca-Cola re-appeared (it was thrown out in the wake of the 1977 FERA regulations). Slowly beginning to dominate the Indian market — Coca-Cola bought out Parle Beverages and its brands Thums Up, Limca and Gold Spot; in 1999 it acquired Cadbury Schweppes' brands Crush, Canada Dry and Sport Cola. Pepsi, on its part, took over Mumbai-based Duke range of soft drinks — they now rule over it. By March 2001, government estimates that 6540 million cold drink bottles were sold annually in the country. In other words, with over a billion Indians, each Indian would be drinking roughly 6 bottles of soft drinks each year (compare: Pakistan, 17 bottles per capita per year; Sri Lanka, 21 bottles; China, 21). In Delhi, the consumption is a whopping 50 bottles per person per year. Companies are now busy wooing rural markets — the innovative 200 ml bottle, costing Rs 5-7, has been hailed as a success. In short, colonisation is here to happen.

But how can quality-conscious multinationals market products unfit for human consumption?

The regulator's meaningless maze

Will they get away with it?

They wouldn't have got away in the US. Legally enforceable norms exist there, that regulate the kind of water used to make cold drinks with. (Remember, the main ingredient in a cold drink — or carbonated non-alcoholic beverage, as it is technically called — is water.) In the US, regulations provide that the quality of water used to make cold drinks must be the same as that used to make bottled water. 'Raw water' used to make bottled water falls under the regulative umbrella of the US Food and Drug Administration. In their rule-book, water consumed in this form is a 'food'; therefore

water used as an ingredient in beverages — also therefore a food — must meet the same standards as bottled water. In addition the Safe Drinking Water Act, a federal legislation under the Environment Protection Agency (EPA), stipulates drinking water standards to protect public health. Its primary standards are legally enforceable nationwide. The state of Massachusetts, for instance, stipulates that the source water used for bottled water (and carbonated drinks) must meet the federal EPA national primary drinking water standards.

They wouldn't have got away in Europe. The European Economic Council Directive 80/778/EEC lays down standards for the quality of drinking water intended for human consumption. Such water, it clearly specifies, shall include water used in a food production undertaking for the manufacture or processing of products and substances intended for human consumption, or effecting "the wholesomeness of the food-stuff in its finished form". (From December 25, 2003, this directive will be repealed and replaced by Directive 98/83/EC, in which the maximum admissible concentration for individual and total pesticide is the same.)

But in India, these companies cannot be taken to court. In fact, forget legal procedure; these companies cannot even be politely told to stick to norms. The norms that regulate manufacture of cold drinks in India are a meaningless maze.

There is Rule 65 of the Prevention of Food Adulteration Act, 1954 (PFA). Rule 65 regulates the presence of insecticides and pesticides in food. But "food" is so defined in Rule 65 as to exclude "beverages". Does this mean the Act has nothing to say about cold drinks? Not at all. Sub-section A.01.01 in Appendix B defines the standards of quality for non-alcoholic beverages, but has nothing to say about pesticide residues. This Act is mandatory, but does not regulate pesticides in soft drinks.

Then, there are the specifications for "sweetened aerated water with no fruit juice or fruit pulp or containing less than 10 per cent of fruit juice or fruit pulp" in Part II (D) of The Fruit Products Order (FPO), 1955. FPO rules are as mandatory as the PFA's. It regulates the general characteristics of a beverage. On the quality of the basic raw material it merely says: "water used in the manufacture shall be potable and if required by the licensing officer shall be got examined chemically and bacteriologically by any recognised laboratory". Please note: "water...shall be potable". But what is "potable"? The Order does not define it; legally, therefore, the order provides no scope to regulate pesticide residues.

These two mandatory sets of rules apart, there exists IS 2346: 1992, a norm of the Bureau of Indian Standards (BIS). It lays down specifications for "carbonated beverages". In the



In India, these companies cannot be taken to court.

These companies can't even be politely told to stick to norms.

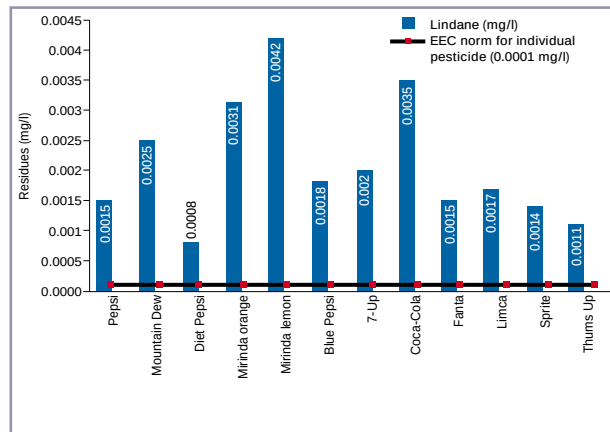
The norms that regulate manufacture of cold drinks in India are a meaningless maze





ANGSHUMAN DE / CSE

Lindane: enjoy! Yeh dil maange more?



“foreword” to this document, water is clearly mentioned as an ingredient in carbonated beverages: “The quality of a carbonated beverage depends on the quality of the *various ingredients* that go into its manufacture — water, acidulants, sweetening agents, emulsifiers and stabilisers, flavour, colour and carbon dioxide being the important ones” [emphasis added]. The document then prescribes the requirements and methods by which the quality of carbonated beverages may be gauged. As part of this process, it lists the various ingredients that can be used to make carbonated beverages. In this list, there is no mention of water! In any case, this BIS standard is voluntary in nature (unlike the certification for bottled water); a company needn’t meet its specifications.

BIS has another standard, also voluntary — is 4251:1967 (reaffirmed 1977) — which prescribes standards for “quality tolerances for water for processed food industry”. It’s a bizarre piece of standard-setting. In its foreword, it says: “In processed food industry, water is used for a number of purposes, such as processing, washing, flushing and general usage and also for boiler feed and cooling”. Isn’t it also used to make cold drinks?

The bottom line is that in India, the cold drinks industry is virtually unregulated. Strangely, it is also exempted from the provisions of industrial licensing under the Industries (Development and Regulation) Act, 1951. It gets a one-time

license to operate from the ministry of food processing industries, which includes a non-objection certificate from the local government and a water analysis report from a public health laboratory. It also requires a no-objection certificate from the state pollution control board. That’s it. There’s no environmental impact assessment, or siting regulations for the industry. Its use of water — largely unpriced groundwater — is not regulated.

Forget pesticides. Standards for other substances — such as heavy metals like arsenic or lead — also are many times above the guidelines for drinking water issued by the ministry of urban development (see table: *Standards to regulate...*). For instance, for deadly arsenic, standards differ in different regulations — in soft drinks under the mandatory Food Products Order it is 0.5 ppm; under the BIS ‘voluntary’ standards, the quantity drops to 0.25 ppm; and strangely, drinking water guidelines specify a safe level of only 0.01 ppm. Therefore, soft drinks have been allowed 50 times higher arsenic content than in drinking water. Allowed lead levels for soft drinks are 50 times higher than bottled water. Cadmium is not even legislated. Why? Don’t ask. Working within the meaningless maze of such regulations, common sense dictates that a company would love to set up shop in India.

For full report, log on to www.downtoearth.org.in

Standards to regulate other harmful substances in soft drinks are equally haywire (in ppm)

	Food Products Order, 1955	Prevention of Food Adulteration Rules, 1955	Carbonated beverages IS: 2346:1992	Bottled water IS:14543:1998	Drinking water guidelines ¹
PESTICIDES					
Pesticide residues	No standards	No standards	No standards	0.0001 (individual) 0.0005 (total)	Absent
HEAVY METALS					
Arsenic in soft drinks	0.5	0.5	0.25	0.05	0.01 (max: 0.05)
Cadmium	No standard	No standard	No standard	0.01	0.01
Lead (soft drink not including the concentrates used to make the drink)	0.5	0.5	0.5	0.01	0.05
Lead (concentrates used to make soft drink)	2.0	2.0	—	—	—
OTHERS					
Copper (soft drink not including the concentrates used to make the soft drinks)	5.0	7.0	1.5	0.05	0.5 (max: 1.5)
Copper (concentrates used to make soft drinks)	20.0	20.0	—	—	—

Source: 1. Ministry of urban development 1999, *Manual on Water Supply and Treatment*, 3rd edition — revised and updated, Central Public Health and Environmental Engineering Organisation

Bottled water norms notified

More new norms wanted



The Indian government has notified new standards for pesticide residues in bottled water. The notification came on July 18, 2003, bringing the curtains down on a 6-month drama that had turned quite farcical.

6 months ago, a study conducted by the New Delhi-based Centre for Science and Environment (CSE) (see: *Down To Earth*, Vol 11 No 18, February 15, 2003) showed that most brands of bottled water being sold under the ISI quality certification mark were pesticide-laden. Indian regulatory law for pesticide residues — the Prevention of Food Adulteration Act, 1954 (PFA) and standards specified by the Bureau of Indian Standards (BIS) — was exposed as archaic.

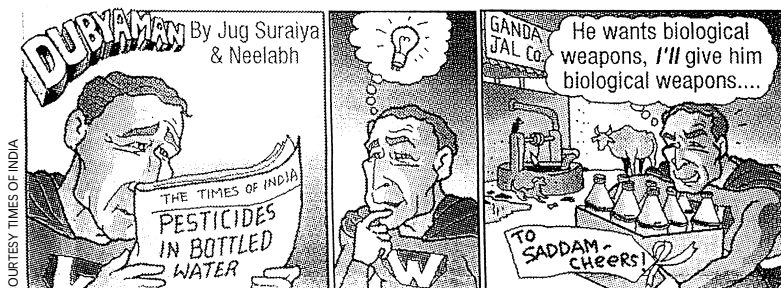
Government was embarrassed. BIS formed an expert group to look into the matter. It proposed new standards for bottled water, which recommended quantified maximum residue limit for individual and total pesticides. It also recommended that a total of 32 pesticides should be screened and analysed by an accredited laboratory, using internationally established test methods.

On another front, a four-member committee — under Satwant Reddy, additional secretary in the Union ministry of consumer affairs, food and public distribution — set up to study the proposed notification submitted its report on March 25. The committee supported the proposed notification but said that when “BIS establishes a standard it must specify the corresponding test methods” The proposed amended notification, which said that the analysis should be conducted using internationally established test methods, was “vague” and “BIS should set up another committee to specify testing methods.” The report was submitted to Sharad Yadav. He asked BIS to set up a committee to look into testing methodologies. That seemed to be the end of the matter.

While all this was going on, Union minister for health and

family welfare Sushma Swaraj grandiosely declared that by April 1, 2003, the new standards would be adopted via an amendment in the PFA Rules, 1955. But the April 1 deadline came and went. The new standards couldn't be adopted because public comments on the draft rules were being studied. On April 7, the matter was placed before the Central Committee for Food Standards (CCFS), the highest body in the country that sets mandatory minimum safety standards for food items. It unanimously agreed that new standards should be adopted. The decision was communicated to Swaraj. And that, too, seemed to be the end of the matter.

Then in July, BIS and the ministry of health held parleys with scientists and industry. The BIS meeting cleared the notification with an amendment specifying the choice of testing methodologies, but even at this late stage, industry opinion



was that the proposed notification needed dilution before enactment.

Now the notification is official. It will come into force from January 1, 2004.

Flash in the pan?

Arguably, the Indian government's ways of setting standards for food and similar consumables — drinking water, carbonated water — are standard-setting in themselves. No one the world over can follow it;

- The chief players in the standard setting exercise are the Union ministry of health and family welfare (MOHFW); the BIS, a nodal agency entrusted with the task of setting standards under the Union ministry of consumer affairs, food and public distribution (MOCAPFD); and the Union ministry of food processing industries (MOFPI). But other ministries, such as the Union ministry of agriculture and the Union ministry of commerce and industry, often play an important role.

All the ministries have their own system for setting standards in the country. Ineptitude and lack of scientific rigour mark the standard setting exercise in the country.

- At present, the Indian food industry is governed by 14 separate pieces of legislations, which specify different standards.
- The most important compulsory legislation is the PFA.

Notified, at last

Ministry of Health and Family Welfare, Notification, July 18, 2003
Prevention of Food Adulteration (1st Amendment) Rules, 2003

- Pesticide residues considered individually — not more than 0.0001 mg/litre (The analysis shall be conducted by using Internationally established test methods meeting the residue limits specified herein)
- Total pesticide residues — not more than 0.0005 mg/litre (The analysis shall be conducted by using internationally established test methods meeting the residue limits specified herein)

“Reddy” remedies

Satwant Reddy committee: Report of the committee on the pesticide residue in packaged drinking water and packaged natural mineral water, March 25, 2003

Setting standards

- BIS should have a core group of scientists from various fields to keep track of recent scientific and technical developments in critical areas.
- For the sake of transparency, the constitution of the various committees, panels or such bodies involved in standards formulation should be on the web.
- It is sometimes stated that vested interests, particularly big industry, influence BIS' activity. This criticism emanates from the fact that standard formulation is a voluntary activity and BIS does not pay anything for participation in meetings of the technical committees. At times the participation of scientific organisations and consumer organisations remains on paper, while industry participates more actively.

Implementing standards

- Enforcement of BIS Act is weak. Search and seizure operations are carried out on the basis of specific complaints. Prosecution does not reach its logical conclusion for several years.
- BIS should review its internal resources before accepting further responsibility. But once it accepts the responsibility, it must discharge it faithfully and not cite lack of human resources as justification for non-adherence to norms.
- BIS must revitalise its core competencies. Existing procedures, formulated several years ago, are shrouded in secrecy and confidentiality. These may be reviewed by expert groups, to achieve maximum transparency.

Pesticide policy

- Need to review permissible limits of contaminants in other food products under PFA. This may also lead to a wider discussion regarding permissible levels of use of pesticides and fertilisers for agriculture and horticulture.

Drinking water policy

- In developed countries all water for human consumption — publicly distributed or privately sold — conforms to a single standard: the one for drinking water. In India these standards are now limited to bottled water. Why? It is time that consumers demand pollution-free drinking water and the municipal machinery gears itself up to meet this rightly demand.

Groundwater policy

- A water recharging system should be made mandatory for the bottled water industry. Before licence renewal, a no-objection certificate should be obtained from concerned monitoring agencies. There should be some guidelines regarding selection of a site where a bottled water plant is to be installed, to ensure that it is free from pollution. Disposal of waste from water purification plants needs to be monitored.

Under it, the manufacture, sale, storage or distribution of products not conforming to the standards laid down under the laws is a contravention leading to fines and imprisonment. The CCFS and its various subcommittees under the Directorate General of Health Services, under the MOHFW is responsible for operation and enforcement of the Act.

- The Essential Commodities Act, 1954 has a number of control orders to regulate manufacture and production of food. The Fruit Products Order, 1955 (FPO) which regulates fruits, vegetable products, sweetened aerated drinks and other like products, is operated by the ministry of food processing industries through the Central Fruit Products Advisory Committee. The ministry issues the license for manufacture and labelling of these products. In addition, there are specific orders for solvents and edible oil, flour, meat.

- BIS is an apex standard setting body in the country. It has statutory powers and was set up under the Bureau of Indian Standards Act, 1986. Till now BIS has specified standards for close to 17,000 products/items/technologies. Out of these, standards for only 168 commodities — mass consumption products affecting consumer health and safety — are mandatory via various acts or notifications of the government.

- The Director of Marketing and Inspection formulates standards known as AGMARK, under the provisions of the Agriculture Produce Grading and Marking Act and Rules (1986 and 1988). These standards certify quality in products. There are also non-starter schemes, like the ECOMARK, of the Union ministry of environment and forests (MOEF), which specifies standards for labelling environmentally friendly products.

- In 1995, the government appointed a task force under the chairpersonship of retired Justice E S Venkataramaiah to suggest a simplified and harmonised food law. The task force asked for a “paradigm shift in the legal framework to promote good manufacturing practices”. Then the prime minister's council on trade and industry appointed a subject group on food and agro-industries headed by industrialist Nusli Wadia. It also called for harmonisation of laws under a single authority. Currently a group of ministers under the ministry of food processing industries is working on a comprehensive legislation on food standards. Whose interest will these new harmonised standards serve? That is a matter of frightening speculation.

- The March 25, 2003 report of the Satwant Reddy committee on pesticide residue in packaged drinking water and packaged natural mineral water makes important recommendations on standard setting in general (see box: “Reddy” remedies). But as yet, little is moving on this front.

These are glimpses into a regulatory scenario that's quite nightmarish in its criss-crossings and cross-cuttings. If today, there is a clear need to regulate industries that are a challenge to public health, then the legally enforceable means that are available are nothing but swathes of cobwebs. If today, there is a clear need for regulatory institutions that are scientifically competent, then the current state of knowledge on cutting edge research and capabilities is bathetically minimal. If today, these institutions must become as powerful as industry in order to turn gazette notifications into a public good, then government lacks both brain and brawn.

WANTED: precisely brain and brawn

There are pesticides in manufactured consumables because there are pesticides in the 'raw water' used. There are pesticides in the source water because there are pesticides being blatantly used in fields. Thus any policy to provide consumers in India with quality consumables can do nothing until it takes into account these deadly chemicals. This causative logic is so plain it requires no articulation. Unfortunately, it needs to be.

This is one reason: "One should not be afraid of pesticides. They are in fact friendly and responsible for making us food sufficient" — O P Dubey, assistant director-general at the Indian Council of Agricultural Research quoted in the national daily *Times of India* on the issue of bottled water standards. This is another: "It will be premature for India to take a decision to adopt a strict standard" wrote Amit Mitra, secretary-general of the Federation of Indian Chambers of Commerce and Industry in a letter to the health secretary, on standards for bottled water.

Whatever agricultural scientists or industry bodies say, the larger issue that emerges from both the bottled water episode and now the test results is the need for stringent and quantified norms for pesticide residues in drinking water and other kinds of food. This has to be based on the available science of pesticide residue impact on human health. How does one determine this safe level? It requires a high order of scientific research on chronic exposure levels. It requires regular and periodic reviews of the latest research on the toxicity of these substances. Unfortunately, India, with its bombastic claims of scientific capacities, has neither worked on collecting evidence from pesticide use, nor done much toxicity research.

These processes can be put into motion. Till that happens, Indian standards for pesticides would have to be based on the standards set up different international agencies or governments, namely the World Health Organization (WHO), Food and Agriculture Organisation (FAO), the US Environment Protection Agency (USEPA)/Food and Drug Administration (FDA) or the European Union (EU). Most agencies stipulate different limits for different pesticides, whereas, EU under its norms, has agreed on a value, which is low enough to ensure that no chemical is toxic to the human being.

But ad hoc choosing from different sets of regulations could become a completely meaningless activity, simply because there would be no scientific basis selecting a particular norm from say, WHO in one case or USEPA/FDA in another.

The greatest danger is that new norms could become lax. Let's take an example.

Suppose we were to extend the spirit of the bottled water norms and make drinking water standards to regulate the pesticide chlorpyrifos. We could begin with WHO and FAO. They have separately, and jointly under the Codex Alimentarius Commission, set global guidelines for pesticide residues in food. These are minimal guidelines. The agreed norm is that

countries should set higher norms based on their individual conditions. So, for instance, WHO has recently issued draft guidelines for drinking water quality, in which, the proposed guideline limit for chlorpyrifos is 0.03 mg/l.

But recent research indicts this pesticide. A new study based in New York found that women exposed to chlorpyrifos during pregnancy gave birth to babies with reduced birth weight and reduce head circumference. This, researchers noted with worry, was when the mothers had very low levels of exposure to this pesticide. Thus if we were to go for chlorpyrifos norms, would the WHO guidelines not be inadequate?

Consider other complications. In 2000, Dow Chemicals was forced to withdraw Dursban (Dow trade name for chlorpyrifos) from residential and commercial use in the US. Currently its use is restricted in agriculture and USEPA is working towards a complete phase-out by 2005. But Dow is now busily promoting this chemical in countries like India. Needless to say USEPA has not put any restriction on export of chlorpyrifos. During 1999-2000, it was the fourth most used insecticide in India with an installed manufacturing capacity of around 14,000 tonnes. Therefore,

selecting a lax WHO guideline for this pesticide would be irresponsible, to say the least.

In addition, norms for regulating multiple residues do not exist in most regulations. Only EU stipulates a single residue limit (0.0001 mg/l) and multiple residue limit (0.0005 mg/l). This single quantified limit makes it easier for the regulator to enforce.

We do not have a pesticide policy in the country, to regulate this powerful industry and ensure the chemicals registered and sold are 'safe' for use. More importantly, as information about toxicity of pesticides only trickles in after these 'wonder' chemicals have been sold and we have been duped, our regulatory mechanisms need to be geared towards constant review and recall. Even more importantly, the policy must set the framework of research, innovation and experimentation, to introduce a new generation of environment-friendly pesticides in the country. This business must begin in earnest.



COURTESY UNNAY / INDIAN EXPRESS

**The business to introduce
a new generation
of environment-friendly
pesticides must begin
in earnest**

By regulation, the soft drink industry must use “potable” water. But what’s that? Who ensures municipalities meet standards? What standards? Under which law?

We found to our horror...

Drinking water falls under the purview of Union ministry of urban development and poverty alleviation (MOUDPA). The Central Public Health and Environmental Engineering Organisation (CPHEEO) under this ministry sets guidelines for drinking water quality. Local bodies — such as municipalities and public health engineering departments in urban areas, and the Rajiv Gandhi National Drinking Water Mission under the Union ministry of rural development in rural areas — are expected to

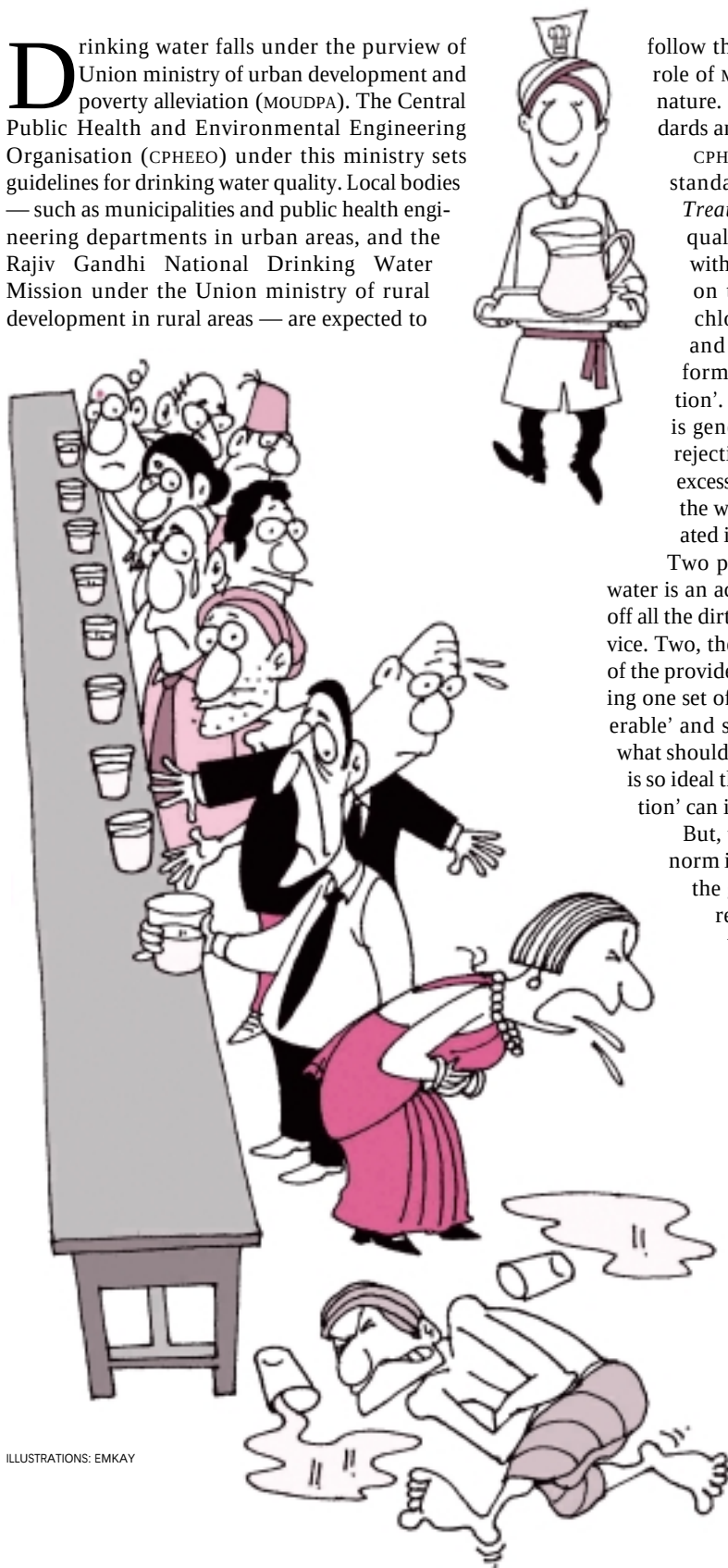
follow these guidelines. But water is a state subject. The role of MOUDPA is therefore merely recommendatory in nature. It is the state government that must adopt standards and enforce them.

CPHEEO has recommended drinking water quality standards in its *Manual on Water Supply and Treatment*. It says that, “the physical and chemical quality of drinking water should be in accordance with the recommended guidelines”. And then it goes on to describe the parameters, such as turbidity, chlorides, fluorides, arsenic, cadmium, pesticides and so on. The prescribed standards exist in two forms, or criteria: ‘acceptable’, and ‘cause for rejection’. ‘Acceptable’ defines the limits up to which water is generally acceptable to the consumers. ‘Cause for rejection’ means there are substances in the water in excess of the limit defined as ‘acceptable’, so rendering the water not acceptable. Still, the water may be tolerated in the absence of an alternative and better source.

Two points here are worth noticing. One, providing water is an act of defence: the standards are weapons to fend off all the dirty things in the water. It is not a fundamental service. Two, the standards assume no responsibility on the part of the provider to provide ‘clean’ water; thus water not matching one set of standards may be sickeningly passed off as ‘tolerable’ and so provided. The CPHEEO ‘acceptable’ limits are what should ideally be achieved. Simultaneously, ‘acceptable’ is so ideal that it needn’t be attempted at all: ‘cause for rejection’ can indeed be prescriptively tolerated.

But, the ‘cause for rejection’ becomes the ‘acceptable’ norm in most cases. Interestingly, the range provided in the guidelines is so vast that what should have been rejected as ‘unsafe’ water, becomes the norm for the supplying agency. For instance, in the case of total dissolved solids (TDS) standards range from 500 mg/l to 2000 mg/l. Ask the municipality. They will hide behind 2000 mg/l (see table: *From zero to infinity*).

The escape route suggested in the standards is not accidental. The helplessness that causes a standard-setting document to rely on a bizarre phrase such as ‘in the absence of an alternative and better source’ — this phrase is akin to an administration throwing up its hands and saying: “This is the best we can do. Take it, or leave it” — is an instituted one. The manual calls itself as ‘a code of practice which could serve as a guide in their (public health engineers) day to day practice’. Explains a senior CPHEEO official, “Our manual only recommends standards for drinking water, but they are not legally binding as they



From zero to infinity

Vast range of various parameters in drinking water guidelines

Parameters	Bureau of Indian Standards IS:10500: 1991 ¹		Central Public Health and Environmental Engineering Organisation (CPHEEO) ²		
	Requirement (Desirable limit)	Undesirable effects outside the desirable limits	Acceptable*	Cause for rejection**	Range between guidelines
Total Hardness (as CaCO ₃)	300	Encrustation in water supply structure and adverse effect on domestic use. Extendable to 600 in the absence of alternate source	200	600	3 times
Chlorides (as Cl), mg/l, Max	250	Beyond this limit, taste and appearance are affected. Extendable to 1000 in absence of alternate source	200	1000	5 times
Total dissolved solids, mg/l, Max	500	Beyond this, palatability may cause gastro-intestinal irritation. Extendable to 2000 in absence of alternate source	500	2000	4 times
Copper (as Cu), mg/l, Max	0.05	Astringent taste, discoloration and corrosion of pipea and fittings will be caused beyond this. Extendable to 1.5 in the absence of alternate source	0.05	1.5	30 times
Manganese (as Mn), mg/l, Max	0.1	Beyond this limit taste/appearance are affected. Has adverse effects on domestic use and water supply structures. Extended to 0.3 in absence of alternate source	0.05	0.5	10 times
Arsenic (as As), mg/l, Max	0.05	Beyond this the water becomes toxic. No relaxation is allowed.	0.01	0.05	5 times
Zinc (as Zn), mg/l, Max	5	Beyond this limit, it can cause astringent taste and an opalescence in water. Extended to 15 in the absence of alternate source	5.0	15.0	3 times
Anionic detergents (as MBAS), mg/l, Max	0.2	Beyond this limit, it can cause a light froth in water. Extended to 1 in the absence of alternate source	0.2	1.0	5 times
Aluminium (as Al), mg/l, Max	0.03	Cumulative effect is reported to cause dementia. Extended to 0.2 in the absence of alternate source	0.03	0.2	6.7 times

Note: *'Acceptable' means limit upto which water is generally acceptable to consumers; **'Cause for Rejection' means figures in excess of 'acceptable' but may be tolerated (in the absence of an alternative and better source), but only upto the limits set for this criterion. Above this, water source has to be rejected.

Source: 1. Bureau of Indian Standards 1991, *Indian Standard Drinking Water – Specification (First revision)*, New Delhi. 2. Ministry of Urban Development 1999, *Manual on Water Supply and Treatment*, Third edition-revised and updated, Central Public Health and Environmental Engineering Organisation, pp 14-15.

are not part of any gazette notification. Our standards are based on the World Health Organization (WHO) guidelines, and the drinking water standards proposed by the Bureau of Indian Standards (BIS).” He has further, compromising, information to give. “Consumers cannot take the local water supply agency to court if it fails to deliver the quality of water specified in the CPHEEO manual. To a large extent the quality also depends on the way consumers handle it,” he lamely ends.

Could this be true? The National Institute of Urban Affairs (NIUA), New Delhi, a premier institute for research, training and information dissemination in urban development and management, thinks so. “The role of MOUDPA is recommendatory in nature. The manual of CPHEEO only recommends what

should be the drinking water quality, but the standards are not legally binding on the local governments. BIS has also developed drinking water quality standards but they are not mandatory.”

That’s true. Apart from CPHEEO, BIS has also developed drinking water quality standards. But whereas BIS’ bottled water norms have been notified under the Prevention of Food Adulteration Act, 1954 (PFA), the drinking water norms remain voluntary in nature. A few years back, pressure was put on the Indian government to include drinking water under the PFA as ‘food’. Nothing happened.

SHOULD WE IMPROVE
OUR DRINKING WATER
QUALITY?



NO...BUT WE MUST DO
SOMETHING TO IMPROVE
THEIR IMMUNITY..

When nothing happened

PFA was enacted in 1954. The Union ministry of health and family welfare (MOHFW) is its implementing agency. When the Act was notified, water was not covered under it as ‘food’. It defined food under section 2 (v) as “any article used as food or drink for human consumption other than drugs and water...”. According to sources at MOHFW, the reason is that water supplied through municipal taps is not used for drinking purposes alone. It is also used to other household chores like washing and cleaning. Hence, it is not food per se.

In 1996, a group of people recognised the fallacy. All of them were part of a Committee on Subordinate Legislation (CSL) that had got together to do a think, or rather a re-think, on the rules and regulations framed under the PFA. CSL proposed that water should also be included in the Act as a food item. The committee gave two reasons. As the *Fifth Report of Committee on Subordinate Legislation (Eleventh Lok Sabha)* published in 1997 puts it:

“One, water is treated and purified by the local authority before it is supplied to the public. Thus there is always a possibility of the purity of water supplied falling below the prescribed standard, which renders it injurious to health.

Second, sometimes it is found that the water supplied contains viruses or bacteria, which cause jaundice, typhoid and other water-borne diseases and people who consume it contract such diseases.

Whichever agency is responsible for supplying drinking water to the public has responsibility to ensure the purity of water so supplied and the committee strongly feels that the statute should bind it to do so. Otherwise the whole population will be exposed to serious health hazards, with no one owing responsibility for it”.

CSL recommended that immediate steps be taken by the government to amend section 2 (v) of the Act, to include water

treated and supplied by local authorities within the definition of 'food'.

Now get into complex, deliberative, bureaucratic give and take. The recommendations had to go to the MOHFW, ministry in charge. It did:

"Supply of potable water in the urban areas comes within the purview of Ministry of Urban Affairs and Employment (at present Union ministry of urban development and poverty alleviation). Supply of drinking water in the rural areas is ensured by the Ministry of Rural Areas and Employment (at present Union ministry of rural development) who have set up technology mission on water for providing water at each village. A letter has been sent to these Ministries to send their comments. On receipt of the same the matter will be examined to amend the PFA Act."

Files moved, in due course. In time — should we say: "duly"? — the Union ministry of urban development replied: "the widening of the definition of food to include water will bring it under the Prevention of Food Adulteration Rules and consequently would impose a legal commitment and obligation on the agencies for adhering to the recognised standards for potable water supplied by them. As you are aware, drinking water in urban and rural areas is generally supplied only by the State Governments undertakings or the local bodies. The burden of this commitment will fall, therefore, on these agencies and more than the urban local bodies the responsibility will be greater in the case of rural local bodies where the required standards have not yet been reached and who are also facing financial crunch."

As a bureaucrat would happily put it, this was an insuperable argument. Of simply not wanting to take on the task of providing clean water; of simply avoiding it; of representing a scene of change for the better as a pure financial nightmare. This is arrogant administration presenting itself as soft governance. This is plain shirking.

Unfortunately, CSL lost it right here. CSL finally lamely recommended that funds may be made available to these local bodies to help them supply 'good quality drinking water' and this could be implemented in phased manner.

Almost a decade has gone by.

But absolutely nothing has moved on this front. Drinking water remains unlegislated in India. So it is that, at present, we have PFA, which prescribes the standards for bottled water and is implemented by the MOHFW. Oh, there is also the Water (Prevention and Control of Pollution) Act, 1974. It monitors surface water quality, chiefly rivers. The Central Pollution Control Board under the Union ministry of environment and forests (MOEF) implements this legislation. Groundwater still remains unlegislated with an eternally drowned draft legislation at the central level, though some states such as Goa have enacted groundwater legislation (But see: *Crass act*, p 46). But what about drinking water?

Too much of a responsibility, it seems!

Hold on. Define drinking water

What is 'drinking water'? The term is synonymously used with 'potable water', 'wholesome water', 'safe drinking water', or 'clean drinking water'. For instance, the Delhi Jal Board (DJB) website claims that that "drinking water, supplied by Delhi Jal Board, is potable, wholesome and conforms to the standards laid down by the Ministry of Urban Affairs and Employment. The quality of water is checked at every stage of treatment — from Raw Water stage to storage reservoirs and also in the distribution system at the Consumer's end". Questioned further about this DJB claim, Sanjam Chima, advisor public relations, DJB said, "We are following the water quality guidelines developed by the CPHEEO. As far as their legal nature is concerned,



you should either ask the CPHEEO or the Delhi government." Interesting. The body supplying drinking water to consumers, and monitoring its quality, does not know if the standards which it claims to be following are legally binding or not.

Admits an NIUA official, "I have not come across any common definition of drinking or potable water. It is very ambiguous and quite likely that it has not been defined legally." This lack of a common legal definition gives enough space to state agencies to play around with drinking water quality.

This becomes amply clear the moment one looks at various municipal byelaws.

"As far as possible"

Water is a state subject. The Centre, therefore, can only 'recommend'. It is the state, and its (state-level) agencies, that have to ensure quality drinking water. Various municipal laws show government is completely non-serious about drinking water. According to the section 234 of the Calcutta Municipal Corporation Act, 1980, it is the corporation's duty to supply wholesome drinking water to consumers. The Act also says that the municipality should take steps to provide *as far as possible*, a supply of wholesome water. It further adds that the corporation shall, *paying regard to available resources*, provide civic services including water supply. Such clauses are more like escape routes.

The Rajasthan Water Supply and Sewerage Corporation Act, 1979 goes a step further. It makes no explicit mention of the corporation's duty to supply water to the consumer. Under section 42 of the Act, the department is absolved of not



supplying water when there's an accident, such as electric power supply failure or leakage or burst main pipes or obstruction or low pressure in the mains in summer, or a labour strike. The department retains the right to suspend water supply at any time and for as long as may be found necessary for repairs or for laying new lines.

The Delhi Municipal Corporation Act, 1957 says that steps should be taken to provide, *as far as possible*, a supply of wholesome water. The Act also says that when it is not practicable to provide such supply at a *reasonable cost* and there is danger to health from the quality of water being already supplied, water must be made available at a *reasonable distance* from every house.

The Tripura Municipal Act, 1994 says that every municipality shall either itself or through any agency (including a government department) *try to supply* water for the use of the inhabitants. The Act leaves it to the municipality to decide the standard and quality of water that is to be supplied for domestic or non-domestic use.

Says senior advocate Rajeev Dhavan, "Using phrases like 'as far as possible', or 'paying regard to available resources', shows how state governments are creating fuzziness and weakness in the law and avoiding any possible lawsuit."

Who is responsible? Who can be responsible?

Experts claim that just because quality standards for drinking water have not been legislated in the country does not mean they do not exist. BIS is a statutory body set under the Bureau of Indian Standards Act, 1986. So, the standards it sets are part of the statute and should be observed. Secondly, the standards recommended by CPHEEO might not be statutory

in nature but are strongly indicative and should be applied. Vagueness in various municipal acts should not be read as absence of standards.

Some experts suggest that if one looks at drinking water as a 'commodity', then the services provided by the local bodies can be covered under the Consumer Protection Act (COPRA), 1986. In India, water supply is seen as a public health expense and not as a commodity.

Others contest that if we apply COPRA on drinking water, then it is as if the consumer is demanding something from a business entity, whereas right to clean water is a fundamental right. But opinion is crystal clear on one point: irrespective of whether water is a commodity or a public health expense, once drinking water is supplied, it should conform to specified standards.

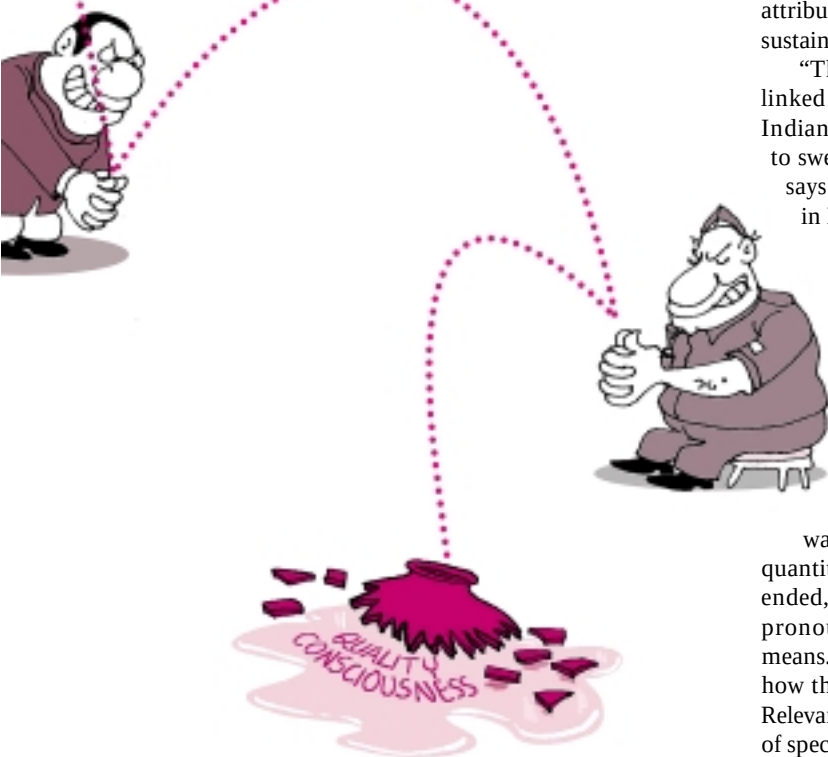
Says Dhavan, "Non-inclusion of water under the PFA shows ineptitude on the part of the Indian government, which is trying to avoid direct responsibility. If water is covered under the PFA then writ petitions would start flying the very next day. Government does not want to guarantee quality of water because major water suppliers are government departments."

There aren't many lawsuits in this country that challenge the quality of water. One famous case is the 1990 case of *Attakoya Thangal v. Union of India*. The case was filed in the Kerala High Court (HC) in which the petitioner claimed that due to over-extraction of groundwater through handpumps and tubewells bored by the local administration at Lakshadweep, there was an ingress of salinity and people were being forced to drink saline water. The HC ruled: "Right to life is much more than the right to animal existence and its attributes are manifold, as life itself. A prioritisation of human needs and a new value system has been recognised in these areas. The right to sweet water and the right to free air are the attributes of the right to life. These are the basic elements which sustain life itself."

"This was a landmark judgement of the court, which linked right to clean drinking water with Article 21 of the Indian Constitution. It said that right to water means right to sweet water and not salty water. But such cases are rare," says Ritwick Dutta, an environmental lawyer based in New Delhi.

This is the fundamental problem with India's water policy. Right to water is agreed upon in principle and policy but is not clearly specifiable.

Suggests Videh Upadhyay of Enviro Legal Defence Firm, Noida, Uttar Pradesh, "The first and the foremost thing which we need to do is to clearly specify what right to clean drinking water means, which the Supreme Court of India (SC) upholds as a fundamental right. In last 5-6 years, many high courts have passed judgements on clean water, but there is no clarity as to what that right means in quantitative and qualitative means. Courts also leave it open-ended, free for interpretation. There needs to be categorical pronouncement by the SC as to what right to clean water means. The second important thing after this would be to see how this direction of the SC gets reflected in various statutes. Relevant changes would require to be made in specific sections of specific rules." ■



Fifth World Trade Organization Ministerial Conference, Cancun, Mexico, September 10-14, 2003

GI woe

Geographical indication debate intensifies as EU ups the ante

CLIFFORD POLYCARP

Under the Trade-Related Intellectual Property Rights (TRIPS) Agreement of the World Trade Organization (WTO), champagne is identified with the particular wine-producing region of France. Scotch whisky is similarly recognised as being purely Scottish. But products such as basmati rice, Darjeeling tea, Kolhapuri slippers and Kanchipuram silk saris — though originating exclusively from specific areas of India — do not get geographical indication (GI) protection within the TRIPS pact. As a result, they continue to run the risk of inappropriate commercialisation in the global market.

India, the EU and 21 other WTO members are hoping to eliminate this inconsistency by getting the GI shield extended to products other than wine and spirits. “Consultations are in progress and the EU is pursuing the case aggressively,” disclosed an official of India’s Union ministry of commerce and industry. It may, however, be noted that with the Cancun ministerial just a few weeks away, there has been no forward movement in negotiations on the subject.

A GI is a sign used on goods that have a specific geographical origin and possesses qualities or a reputation that are due to that place. The false use of GIs by unauthorised parties can be detrimental to both consumers and legitimate producers. While the former are deceived into believing that they are buying a genuine product, the latter suffer a loss of valuable business and possible damage to their reputation.

Members in favour of extension of GI protection include Switzerland, India, Bulgaria, the EU and other developed and developing countries.

This bloc argues that GIs can be used to promote the export of valuable products and prevent misappropriation. These countries also consider it a matter of fairness that such additional protection is not limited to alcoholic beverages. On the contrary, the principal opponents feel that expanding additional protection is beyond the mandate of the negotiations. This camp comprises countries from the Americas (such as the US and Chile), Australia, New Zealand and other bulk exporters of agricultural products.

Negotiations on the matter came to a standstill earlier in the year. In a bid to resolve the impasse, it was agreed on May 14, 2003, that informal consultations would be held under the leadership of WTO director-general Supachai Panitchpakdi. Widening the scope of GI protection to cover other products is one of the implementation issues that need to be addressed within the current round of negotiations. Such issues usually refer to compliance with one’s negotiated obligations. But developing countries view it in terms of correcting imbalances in the Uruguay Round WTO agreements. In the GI standoff, WTO members are not split along the usual North-South lines. Rather, they are

divided between the old and new world countries.

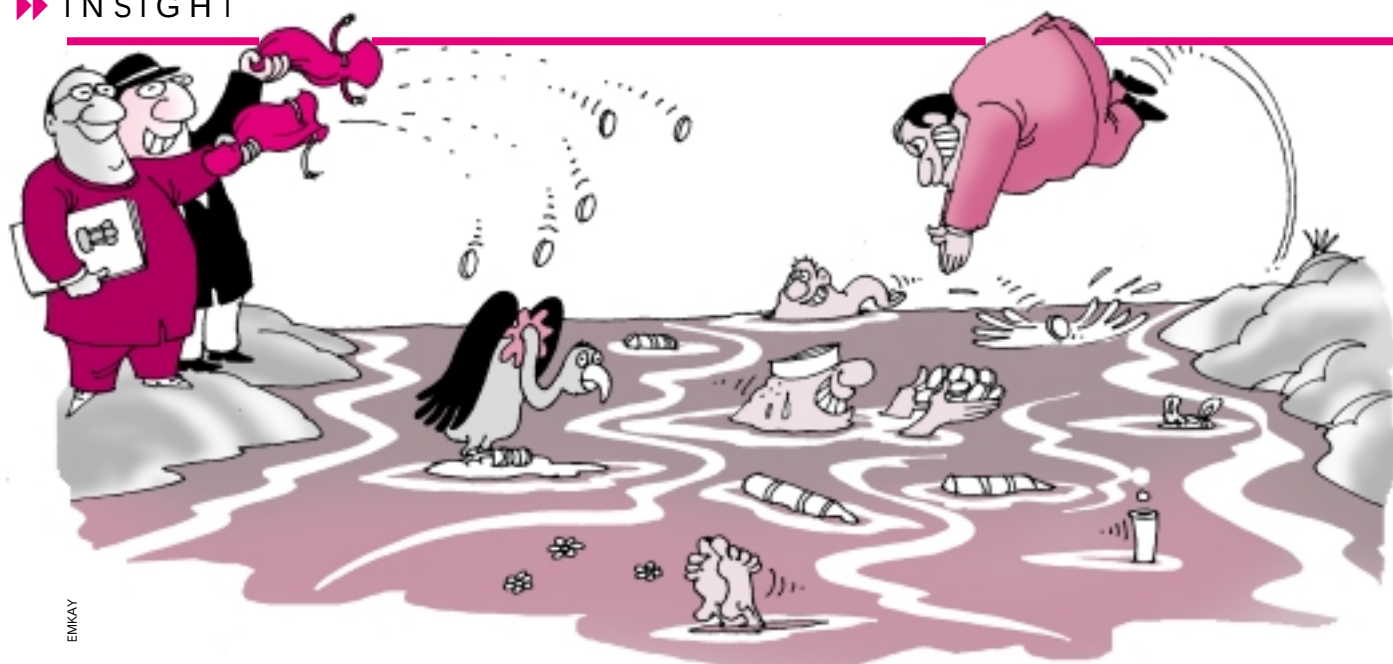
“The outcome of the GI parleys will depend on what happens in (the talks on) agriculture,” pointed out the commerce ministry official. Apparently, Switzerland and the EU have explicitly linked the issues. Even as allowing greater market access in agriculture will open their markets to competition from imports, they hope to offset this by securing additional protection through GIs on their products. To be sure, it does appear that breaking the GI deadlock would require some trade-offs in negotiations on agriculture. Yet the move to connect the two topics may further delay an agreement on GIs. The reason is that consensus on agriculture — the single most important issue — is unlikely to be evolved before December 2004, when the current round of negotiations ends.

In India, a law protecting the GI of goods was passed on December 30, 1999. The Geographical Indications of Goods (Registration and Protection) Act, 1999, seeks to provide better protection of GIs relating to goods in India. The department of industrial policy and promotion of the commerce ministry has also recently prepared and notified the rules to carry out the provisions of the act. The Geographical Indications of Goods (Registration and Protection) Rules, 2002, lay down the criteria and procedure for registration of products known and distinguished by their area of origin.

Significantly, the Indian laws on GI offer protection to goods only in the domestic territory. The country’s products are still vulnerable in the international market — as was experienced in the case of basmati rice in the US. Unless the provisions of the TRIPS agreement are amended to extend protection to other products as well, this risk will remain. GI is an intellectual property right equal to trademarks, designs or patents. But in its present form, it is the only one that discriminates between various categories of products. ■



It appears that breaking the GI deadlock would require trade-offs in negotiations on agriculture



A ritual offer of nothing

Crores spent on a conservation plan that makes rivers dirtier

KUSHAL P S YADAV

On June 16, Prime Minister (PM) Atal Bihari Vajpayee's exhortation to "implement the river conservation programme with a greater sense of urgency and commitment" was an allusive reference to the states' tardiness and cursoriness in executing sanctioned projects. What he mentioned even more obliquely was that the plan itself needed drastic course correction. Or else, why would rivers become more polluted despite nearly Rs 1670 crore having been spent on cleaning them?

The PM was speaking in New Delhi at the 11th meeting of the National River Conservation Authority (NRCA) — the nodal body mandated to decontaminate the country's major waterbodies through the Rs 4,064-crore National River Conservation Plan (NRCP). "We ended up merely skimming the surface (despite the review taking place after a gap of 30 months)," points out a member of the authority. "In all likelihood, the PM talked in generalities because he wasn't kept posted on the nitty-gritty of the matter," he alleges. The events preceding the meeting do suggest that Vajpayee, who also heads the NRCA, was fed selective information.

The Union ministry of environment and forests (MOEF) had prepared an internal background note on the progress of the plan. The financial aspect apart, it used data to illustrate how the quality of Ganga river's water had improved as a result of the almost-two-decade-old programme. But these figures masked the true picture. There was no mention of details such as non-functional sewage treatment plants (STPs), defunct crematoriums and a river in a much worse condition. "All the murky portions of the NRCP and its predecessor, the Ganga Action Plan (GAP), were glossed over," asserts the NRCA member.

Washout all the way

GAP was launched in 1985 and the Central Ganga Authority (CGA) was established soon afterwards as its policymaking arm. The project was the brainchild of the then PM, Rajiv Gandhi. "It was originally meant to be a multi-purpose programme," reveals CGA's first head, K C Sivaramakrisnan. "Under it, a number of remedial measures were suggested. They included interception and diversion of sewage, handling of industrial waste and enrichment of the river's biodiversity to enhance its self-cleaning

properties," he adds.

Sivaramakrisnan, however, concedes: "Over a period, the focus of the programme narrowed to setting up of STPs only." Brij Gopal, professor at the School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, feels: "Right at the outset, GAP was premised on erroneous assumptions like sewage treatment being a panacea for cleaning rivers. The waterbodies were never seen as a complete ecosystem." When asked to explain the anomaly, Sivaramakrisnan passes the buck to subsequent regimes which "politicised the entire plan". Apparently wiser with hindsight, he too echoes the critics' standpoint: "Instead of National River Conservation Authority it should be called National Sewage Treatment Plant Authority."

The first phase of GAP was scheduled for completion in March 1990. But the Union government finally declared it closed in 2000. Though a whopping Rs 452 crore was spent during this stage, many of the 261 sanctioned schemes are in a shambles.

Intriguingly, despite its turning out to be a damp squib, successive governments continued to implement the programme. Worse still, its scope was

widened later. The second phase of GAP was launched in 1993. It included the Ganga's major tributaries: the Yamuna, Gomti and Damodar.

In 1995, NRCP — which encompassed major polluted rivers all over the country — was unveiled. One of its main components was the establishment of STPs and electric crematoriums. In Delhi, the project also involved construction of community toilet complexes for slum areas. GAP phase II was thereafter merged with NRCP and the National River Conservation Directorate (NRCD) set up to oversee implementation of the plans. It may be noted that even under GAP phase II, only 14 per cent of the proposed works could be completed by the March 2001 deadline. Till about six months back, less than half the schemes had been finished.

NRCP currently covers 157 towns and 31 stretches of polluted rivers in 18 states. The cost of the projects is to be shared in the ratio 70:30 by the Union and state governments, respectively. So far 763 schemes worth Rs 2460 crore have been sanctioned under the plan. "The Union government has nothing to show for the hundreds of crores spent on the exercise," contends Rakesh K Jaiswal, head of Eco Friends, a non-governmental organisation that is monitoring the implementation of GAP in the Kanpur region (see table: *GAPing holes*).

Making capital

Jaiswal's opinion is shared by other experts, who aver that only those agencies and enterprises that are implementing the schemes have benefited from NRCP. "With large sums of money being pumped into the project, building works and construction became lucrative propositions," emphasises Sivaramakrishnan. "The sole aim of the players involved in executing the task — creating pumping stations and STPs — is to make a fast buck," says Jaiswal.

Significantly, the Comptroller and Auditor General of India (CAG), in an audit of GAP for 1993-2000, found various instances of financial mismanagement in Uttar Pradesh (UP), Bihar and West Bengal. "(There was) diversion of funds to unauthorised activities (Rs 36.07 crore), incorrect reporting (Rs 6.75 crore) ... and unutilised funds with the implementing agencies (Rs 72.62 crore)....," reveals the CAG report.

"Corruption is rampant at every level in UP. While operators at pumping stations steal diesel meant for running generators, Jal Nigam officers responsible for botching up the first phase of GAP in the state have actually been given plum assignments in phase II," alleges Jaiswal. F U Rahman, team leader of project planning and coordination unit, which monitors GAP-II in Kanpur, admits to delays in the implementation

of the project. At the same time, he categorically refutes the charges of graft.

GAP appears to have met the same fate in West Bengal, too. In the 2001 audit exercise for the state, the CAG found glaring instances of financial favours doled out to contractors. The losses to the exchequer run into crores of rupees, notes the damning document. *Down To Earth's* repeated attempts to elicit a response from B R Das, chief engineer in the state irrigation and waterways department and in charge of implementing GAP in Bengal, proved futile.

Since the stakes are high, almost all state governments queue up at the NRCA to get river cleaning projects cleared. "Though it is widely held that our plans have not been very successful, yet we are flooded with requests for inclusion from various states," asserts an NRCD official.

Going off course

Latest figures on the progress of its plans show that NRCA is plumbing new depths. Six states (Bihar, Jharkhand, Orissa, Rajasthan, Goa and Kerala) out of the 18 under NRCP have not been able to complete even one of the sanctioned projects.

West Bengal could finish only one out of 95 approved schemes despite having spent close to Rs 37 crore. Maharashtra (17 per cent), Karnataka

GAPing holes

In official version about river cleaning plan's impact on Kanpur stretch of Ganga

Name of the drain (nullah)	Pre-Ganga Action Plan (GAP) status	Post-GAP status	
		Government's claims	Factual position
Bhaironghat: raw water source for Kanpur	5 nullahs; domestic sewage fell into channel	Overflowing sewer lines cleaned. All drains tapped	Raw water intake point severely contaminated by at least 15-20 drains located upstream
Parmath Ghat drain	Discharged raw sewage into river from 5 drains	All drains tapped	Parmath Ghat drain still spews sewage directly into the Ganga
Jail drains	Released raw sewage directly into the Ganga	Tapped under GAP	Small drains continue to carry sewage. Locality sewer lines also remain choked. All the sewage, therefore, overflows and enters river
Police Lines drain	Residential waste flowed into the Ganga	Tapped under GAP	No change in condition of these drains. Two small nullahs still flow into the Ganga
Bhagwat Das Ghat drain	Discharged raw sewage into the Ganga	Tapped under GAP	The drain receives maximum sewage from Guptar Ghat intermediate pumping station (IPS). The capacity of the IPS is 3 million litres per day (mld) but the waste which reaches it is approximately twice the quantity. Thus around 3-4 mld of raw sewage flows into the Ganga
OEF drain	Discharged sewage	Tapped under GAP	Two drains still releasing waste into river
Gola Ghat drain	Discharged raw sewage into the Ganga	Tapped under GAP	Pre-GAP position unchanged
Dabka drain	Released raw sewage into the Ganga	Tapped under GAP	The interception and diversion works of GAP have failed. Drain discharges raw sewage and effluent into river

Source: Anon 2003, 'Quarterly report of the Ganga and Ganga Action Plan in Kanpur, April-June 2003', Eco Friends, Kanpur, mimeo

and Punjab (30 per cent), Uttaranchal (32 per cent), Andhra Pradesh (33 per cent), Tamil Nadu (34 per cent) and Gujarat (38 per cent) also fared poorly.

Ironically, even in states such as Delhi and UP, where projects have been implemented at a satisfactory pace (100 per cent and 81 per cent, respectively), pollution levels are on the rise in rivers. For instance, in November 2002, the Central Pollution Control Board (CPCB) — which had provided data on the river water quality for the original plan — found that coliform count had reached an alarming 118 million per 100 millilitres (ml) in a stretch of the Yamuna in Delhi. It should ideally be less than 50/100 ml for drinking water.

CPCB additional director R C Trivedi explains: “Out of more than 3300 million litres per day (mld) of sewage generated in Delhi, only about 1500 mld is treated.” The fact is that most states have failed to create adequate STP capacity — one of the key indicators of progress under NRCP.

Another factor that has hampered the process is lack of proper operation and maintenance (O&M) of assets created under the programme. In 2001, a CPCB report on GAP submitted to the Supreme Court stated: “Adequate funds are not provided for O&M of STPs, particularly in Bihar and UP.” Trivedi feels: “Municipalities simply cannot handle O&M because most of them are broke.”

The CPCB document also notes that a number of STPs in UP such as those in Jajmau, Kanpur, Varanasi, Naini and Allahabad are under-loaded. In Bihar, the Chhapra STP does not receive any sewage as it is located too far away and there is siltation in the drain. The non-availability of uninterrupted power further impedes the plants’ functioning in many places, states the report.

Gopal describes the situation in a nutshell: “The huge investment being made in the plan will count for nothing if the infrastructure lies idle.”

Liquidity problems

On the financial front, the NRCA has been facing a perpetual shortage in bringing its ambitious schemes to fruition. The MOEF has now sought to review its allocation for the projects under the 10th five-year plan. The ministry is seeking more funds despite the fact that the Planning Commission has

consented to raise the gross budgetary support from Rs 1417 crore to Rs 1826 crore.

As against this, almost all the state governments are sitting on unspent money. While the entire sums allocated to Goa and Kerala are unutilised, Orissa and West Bengal have used only 3 per cent and 18 per cent of the sanctioned amounts, respectively. Andhra Pradesh, Karnataka, Tamil Nadu, Punjab, Rajasthan, Uttaranchal and Jharkhand have all spent less than half the approved sum.

Though Delhi has used up 99 per cent of the funds, there are hardly any tangible gains. “About Rs 160 crore spent on constructing community toilet complexes under the Yamuna Action Plan (YAP) seems to have been frittered away. Most of these toilets are either non-functional or remain locked,” reveals an official of the New Delhi Municipal Council. This phase of YAP was funded by the Japan Bank of International Cooperation. The bank was so disillusioned with the efforts of Delhi’s implementing agencies that it slashed the amount sanctioned for the second phase of YAP.

According to an MOEF official: “Often the money meant for NRCP schemes is diverted to other heads.” An environment ministry report states that in Bihar the funds released for GAP-I works were reallocated for different purposes by the state government. A similar trend is emerging for schemes under GAP-II as well. The MOEF also discloses that Jharkhand’s Damodar Action Plan, a part of GAP phase II, is stagnating.

Tiding over

Even as the Union government continues to blunder on with NRCP, experts advocate a comprehensive review of the entire exercise. The starting point should not be construction of STPs but maintaining a minimum flow in the waterbodies, they stress. “Rivers can never be clean till they are allowed to flow,” avers Gopal, adding: “Our engineers have been taught to impound every drop of available water. This



Going to waste: a YAP toilet lies locked

mindset will have to change.”

Another alternative suggested is decentralisation of sewage treatment. “Mammoth STPs have failed to address the problem. In most places, the plants are not connected to the sewerage system. Consequently, they remain unutilised while untreated sewage flows into rivers,” remarks the MOEF official. Gopal concurs: “Sewage needs to be treated where it is generated.”

“The Union government alone should not shoulder the responsibility for cleaning rivers. State-level agencies must share the burden,” emphasises Sivaramakrishnan. “Why should a mayor be allowed to take refuge in the fund crunch alibi?” asks the MOEF official and adds: “We have in the past advised municipalities on how they can generate money for O&M, but to no avail.”

At present, NRCP also ignores the crucial issue of treating the river ecosystem in its entirety. “Flood plain conservation is most essential. A river regulation zone should be formulated on the lines of the coastal regulation zone to manage activities in the entire flood plain of the waterbody,” says Gopal. K Mohan, former advisor, NRCD, favours a legislation-driven overhaul. “Revision of wildlife, forestry and fisheries acts and the enforcement of the measures contained therein will go a long way in conserving water resources,” he says.

To be sure, the PM too has felt the need for pertinent modifications in the river cleaning programme. In this regard, he spoke of involving not only the civil society but also religious personalities and institutions. Implicit in this statement could be sage counsel for certain outfits: do something constructive, for a change. ■

Crass act

Groundwater sale continues in Goa in violation of new law

FREDERICK NORONHA *Saligao (Goa)*

A law enacted to check the illegal sale of water in villages located in the northern parts of Goa has proved to be a damp squib. Tanker operators are openly flouting the state's Groundwater Regulation Act, which was passed in 2002 and notified in 2003.

The main objective of the regulation was to curb the sale of water in areas such as Saligao and Pilerne villages. These two scenic regions of coastal north Goa lie off the water-stressed tourism belt, and have been milked dry by the water mafia. They have witnessed large-scale groundwater extraction for over a decade because of the burgeoning demand spawned by mushrooming industrial estates on parched hilltops and hotel chains along the coast, along with the overall urban sprawl.

As Goa experiences abundant annual rainfall (up to 100 inches), villagers traditionally fall back on wells to meet their water needs. But local people say that the water shortage has been severe during the past two years due to poor monsoons in the state. Against this backdrop, unscrupulous tanker operators have compounded the crisis by drawing and selling millions of litres of water from villagers' wells. Worse still they continue to do so, notwithstanding the recently enforced law. Their task is made easier since most villagers are unaware of the legislation.

Appallingly, the concerned authorities feign ignorance about the illegal activity. "Are they selling water again?" asks an official with characteristic insouciance. In fact, instead of taking action against the culprits, the state government seems to be waiting for the people to complain. "We get reports of water being extracted early morning and late at night. The people are not well-versed with the rules and some neighbours are not coming forward (with complaints)," claims Jagdish S Hosamani, groundwater officer of north Goa.



So the cycle of scarcity carries on

Officials maintain that they have given notices to some illegal operators and seized "one or two" water tankers. "But we have to catch them red-handed because we need hard evidence," asserts Hosamani. He reveals that around 24 tanker owners — mainly from Saligao, Pilerne and Sangolda villages — even approached him for permission to transport water out of the village areas.

For their part, villagers claim that the police are not taking adequate measures to curb the rampant sale of water. "Last month, we seized a tanker that was carrying water to Porvorim. But the police took two hours to respond to our complaint," alleges Fatima Fernandes, a member of Pilerne's panchayat.

Harish Madkaikar, an inspector in the Calangute police station, however, contends that the cops' role in implementing the act is "really limited". He explains: "We can give protection and assistance to the water resources department only when it is required." Mario Mascarenhas, who had filed a case against excessive extraction of water from Sangolda in the 1980s, counters:

"The police should not put the ball in the citizens' court. They have a list of the errant well owners and can immediately nab such culprits." Saligao resident Joaquim D'Mello points out: "The miscreants earlier carried out their activities on the sly. Now they do so in broad daylight."

Meanwhile, the selection process of "water scarce" villages is also mired in controversy. Sangolda village is a case in point. Nestled between tourist attraction Calangute and rapidly developing Porvorim, Sangolda was hit by an acute water shortage sometime in the 1980s. But it is yet to be included in the list of 'overexploited' areas in accordance with the new law.

Faced with a water crisis and official apathy in dealing with it, Saligao is now taking steps to initiate rainwater harvesting in the area. "To an extent, we are also to blame for the situation coming to such a pass. We have been neglecting our wells," observes an 83-year-old villager, and puts pertinent posers: "Do people still build *tollems* (ponds) now? Are we desilting stormwater drains?" ■



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Smart overseers

Women panchayat presidents are no rubber-stamp leaders

E VIJAYALAKSHMI

APRIL 30, 2003: 158 gram panchayat (GP) presidents of Karur district in Tamil Nadu are up in arms over a district collector's order. It has taken away their right to administer the food for work scheme in the district. Worse still, it has conferred this right to the panchayat union chairman — the next rung in the local administration. Leading the GP presidents' protest is Eswari Subramanian, the president of Appilayam gram panchayat.

VANDUVANCHERRY, NAGAPPATTINAM DISTRICT, TAMIL NADU: silicon mining has assumed alarming proportions in this resource rich area, depleting groundwater resources and destroying fields. Heading the villagers' battle against the silicon miners is Rani Muniyakannu, the president of Vanduvancherry gram panchayat.

ESWARI SUBRAMANIAN and Rani Muniyakannu belong to a growing tribe in Tamil Nadu: women GP presidents. Of the 12,619 GPs in the state, one-third or nearly 4,200 panchayats are headed

by women — following the 73rd amendment to the Constitution which stipulates that one-thirds of all panchayat presidents in a state should be women. "But for reservation I would never have become the panchayat president," says Ponni Kailasam, the first woman president of Anaikuppam panchayat, Tiruvarur district. But make no mistake. The feisty women belie the insinuation of rubber stamp leaders that is commonly levelled against women GP presidents. One of the first actions of Ponni, as president of her panchayat, was to convene a gram sabha meeting and pass a resolution against the widely prevalent illicit arrack. She is today a very vocal president of the Federation of Women Panchayat Presidents in Tamil Nadu (FWPPTN).

Says P G Palanithurai, head, Rajiv Gandhi chair for panchayat raj studies, Gandhigram Rural Institute (GRI), Dindigul, "Women panchayat leaders have abundant common sense and commitment and they have picked up the technique of politics very well." He

points to the alacrity with which Ponni reacted to an announcement that the government was planning to introduce cheap liquor. "Ponni who was at GRI for a training programme immediately called up the media, spoke to them and the very next day the headlines were her's," marvels Palanithurai.

Tamil Nadu's women panchayat presidents combine political savviness with a remarkable zeal to challenge traditional power systems in the villages. The women leaders are particularly irked that the control of the village common properties like ponds and tanks is with the *naatanmais* (traditional power groups). According to section 132 of the 1994 Tamil Nadu Panchayat Act, all common properties belong to the panchayat, which has to maintain them. The women presidents believe in this provision — in letter and spirit. Says Ponni, "The panchayats have a lot of common properties, especially the tanks, ponds, quarries and trees, which are in the hands of a few individuals or groups. They should get back these properties and be able to conduct auctions and generate funds".

Palanithurai feels that people have more faith in the *naatanmai* system as they are not yet convinced that the panchayat raj is here to stay. "In the absence

Resplendent change: Ponni Kailasam, who heads the Federation of Women Panchayat Presidents in Tamil Nadu





PHOTOGRAPH: RUHANI KAUR / CSE

Slippery sand miners have a formidable adversary in Rani Muniyakannu, panchayat president of Vanduvancherry village

of the elected panchayat system, the people have seen the special officer manage the panchayats. So they feel, it is better the *naatanmai* continues to administer the common properties," he says. The *naatanmai* system comes into use when the GP has to look for some temporary source of funds. Yet, wherever possible, women presidents are testing the hold of this traditional system.

One good example of this is the Thiruvudaivasal GP in Tiruvarur district, where an influential group controls fishing rights over seven tanks in contravention of the 1994 Tamil Nadu Panchayat Act. Says Malar Malazhagan, president of the GP of Thiruvudaivasal, "The panchayat is losing a minimum of Rs 1 lakh in revenue per year from the seven tanks." Malar has been at the forefront of the Thiruvudaivasal pan-

chayat's battle for regaining rights over the seven tanks. She has filed a writ petition on behalf of her local body in the high court.

The women presidents are also chipping away at caste barriers, displaying ecological concerns and looking for ways to improve the quality of life of people in their villages. Says S Neelakantan, former director, Madras Institute of Development Studies, who lives in Appipalayam village, "Eswari took the bold step of hiring a dalit as the village clerk — he has to visit each house to collect taxes. Measures such as this can pave the way for ending social ostracism of the dalits."

In Vanduvancherry, Nagappatinam district, Rani Muniyakannu is waging a battle against the silicone sand miners in her panchayat. A village rich in resources,

Vanduvancherry has been a victim of mining since 1995. Today the village is criss-crossed with craters, some of which are filled with waters. "Our village falls in a coastal area, so if you dig more than 10 feet deep, the water becomes saline. These miners dig more than that and saline water gets filled up in the pits and that affects the groundwater and the plantations. Groundwater resources and recharge is rapidly declining because of the indiscriminate mining of the topsoil and consequent erosion", complains Rani.

Though they managed to get licences to mine, the mining companies have exceeded the specified area for mining. And the constant movement of lorries has spoiled the roads. "The panchayat doesn't get any income from this and still we have to spend on road repairs," complains Rani. So, the Vanduvancherry panchayat led by Rani passed resolutions against mining, boycotted the parliamentary election in 1998, coordinated the setting up of a joint action committee against silicon

**Women
panchayat
presidents
chip away
caste barriers
and are
ecologically
concerned**

sand mining and picketed the lorries. Rani was arrested and then released when the villagers blocked the roads. She says, "The companies are trying to exploit the poverty of the villagers. They give money to private landowners who are badly in need of money and take sand from their land. The people do not realise the problems that lie in store for them till they get affected. The companies have also tried to silence us by saying they will construct marriage halls, roads and other amenities for the village if we allow their vehicles to pass without any problems. Personally I have been offered money to keep away from the fight. We have resisted all these in the hope that someday we will be able to stop this mining." "I am planning to get together the people from other places, like Marakkanam, where such mining is going on, and then have a larger meeting and protest. We are also planning for a large-scale fast to catch the attention of our Chief Minister," she continues. Rani also presented her village's case in a people's public hearing on the impact of sand mining in Tamil Nadu, held in February 2002 in Chennai.

There is no dearth of problems for these feisty women. For all her work, Malar of Thiruvidaivasal is dependent on her husband to articulate the woes of her panchayat. This being her first term, she is unsure of herself. Does this then mean that the system of proxy is alive? Says Ponni, "We do not have a salary, and the travel allowance is just Rs 300. If

the husband doesn't support, where will the women be?" According to Palanithurai, "Proxy is being operated with the support of the officials who prefer to deal with the husbands than the women presidents. But thanks to the federation, it is gradually on the wane." Adds Ponni, "Many more women come to the gram sabha meetings than before and a lot of women presidents are asserting themselves today."

Their developmental works sometimes land women panchayat presidents in trouble. T Poongothai, the president

of the Keelavalavu panchayat in Madurai district, was removed from her office by the collector of the district using his powers under section 205 of the Tamil Nadu Panchayat act. The reason: cutting and auctioning trees and "misappropriating funds". A resolution to cut trees grown in the local pond and tank had been unanimously passed in the gram panchayat. Poongothai has taken the issue to court. The FWPPTN reacted by condemning her removal and demanded immediate repeal of section 205.

Emerging from her husband's shadow: Malar Malazhgan of Thiruvidaivasal village



What Tamil Nadu women panchayat presidents want

- A travel allowance of Rs.1,000 per month for the gram panchayat president
- Only 8 per cent of the Tamil Nadu state government revenue is allotted to local bodies; this should be increased to 40 per cent
- The government should help in returning common property resources like quarries, tanks, ponds and trees to panchayats. It should also make arrangements for the desilting of tanks, which can be used for agriculture and revenue generation. Every year the government can select one panchayat from each district and make it a model for common property resource management
- All developmental works, including from Members of Parliament and legislative assembly funds, should be implemented with the gram panchayat's approval
- The government should send funds directly to the gram panchayats
- There should be inter-departmental coordination between the revenue, Public Works Department, forest departments and panchayats for maintenance and auctioning of trees
- One computer for each panchayat.

Says Ponni, "The federation is a source of security and a support system for women leaders in panchayats. They know they are not alone." FWPPTN has been constantly evolving and undergoing its own democratic convulsions. It split into two groups in February this year with Ponni heading one group and Eswari the other. Ponni acted fast and formally registered her group. What is more, she met the state government officials to present the federation's demands (see box: *What Tamil Nadu women panchayat presidents want*).

There are sure to be more tribulations for women panchayat presidents. For, they are taking on powerful people without much official patronage and an almost total lack of support from elsewhere. ■

Karanda



Rural India's rich fruit

P PUSHPANGADAN

Karanda is a versatile but under-exploited plant found throughout the dry regions of India. It is cultivated for its edible fruits in Rajasthan, Gujarat and Uttar Pradesh. A number of *karanda* variants are commonly found; according to taxonomists, they all belong to two species — *Carissa congesta* and *Carissa caranda*. The other vernacular names of *karnada* are: Christ's thorn (English), *avighna*, *bahudala*, *jali-pushpa*, *karamarda* (Sanskrit), *kar-wanah* (Urdu), *karancha*, *karanja*, *kainch* (Bengali), *karekay* (Kannada), *karakka*, *kalav* (Malayalam), *kalivi*, *ped-davaka*, *okalive*, *vakaya* (Telugu), *kalaa-ka*, *kila*, *kalakkay* (Tamil) and *karendokuli* (Oriya).

Karanda is mainly a drought-resistant and cold-tolerant plant. It grows and profusely fruits in well-drained soil. In northern India it yields fruits during May-July; but it may bloom throughout the year in southern parts of the country. The plant's fruits are a good substitute for gooseberries. The unripe ones are sour and can be used for making pickles and chutneys. The ripe fruits are sweet: they can be eaten as such, or can be used while preparing salads, jellies, puddings, jams, juices, carbonated drinks or wine.

The fruits contain moisture (91 per cent), protein (1.1 per cent), fat (2.9 per cent), carbohydrates (2.9 per cent) and fibre (1.5 per cent). They are rich in

minerals — per 100 grammes of fruits have 21 milligrammes of calcium. Their calorific value is 42 kilocalorien per 100 grammes. They are also a good source of vitamins such as carotene, thiamine, nicotinic acid, riboflavin, vitamin c and pectin. They contain lupeol, sitosterol and acids of tartaric, citric, malic and oxalic, all of which protect the health along with having a cooling effect.

Wonder cure

Karanda is very valuable for the *ayurveda* system of medicine. It is used for alleviating *vata* and *pitta* disorders. Its leaves, fruits and seed latex are used for treating rheumatoid arthritis, anorexia, indigestion, colic, hepatomegaly, splenomegaly, piles, cardiac diseases, oedema, amenorrhoea, fever and nervine disorders. In the *siddha* medicinal system, the fruits' seeds and latex are used for curing worm infestation, gastritis, dermatitis, splenomegaly and indigestion. The plant is also useful to bring down blood pressure. Alcoholic extract of roots exhibit cardiogenic and anti-hypertensive properties. The roots even come handy while making insecticides. The flowers yield an aromatic volatile oil.

The wood of *karanda* is white with irregularly grey or orange-yellow hard heartwood. It is used for making combs, spoons and other similar household items. It is possible to make a range of products from the wood. This will help

provide employment to many poor people. *Karanda* products can be easily marketed both in the national and international markets because ecoproducts are becoming quite popular. Considering the multifarious utility of the plant, it is important to popularise it and make efforts to grow it in all dry, rocky or sandy wastelands. ■

P Pushpangadan is the director of National Botanical Research Institute, Lucknow

KARANDA CHUTNEY: Mouth-watering *karanda chutney* not only makes a simple menu tangy, but it also acts as an appetiser. Prepared in a short while, it can be consumed for a week or so. For those who want to tickle their palates here is its recipe: take half-a-kilogramme of *karandas* and chop them into two pieces (get rid of the kernels). Add two or three dried red chillies and mustard seeds in a tablespoon of heated oil. Put *karanda* pieces after frying the mixture for a few seconds. Sauté for a while before adding sugar according to taste. Add a little water to this and stir for five minutes, and then enjoy the *chutney*.

KARANDA SUBJI: *Karanda subji* can also add punch to your culinary skills, especially if people around you like sour stuff. Its recipe is as follows: take half-a-kilogramme of *karandas*, and chop them into two pieces. After heating two teaspoons of oil in a wok, put the *karandas* in it along with 250 grammes of chopped green chillies. Besides a pinch of turmeric powder, add salt and red chillies according to taste. Cook for 10 minutes and then serve.



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VIDEH UPADHYAY

The fundamental right to water intends to alleviate suffering. It fails miserably to meet its intention. Feel the lives of those who suffer and see it with the way law in this area operates. Then bear the pain. You will see that it will hurt more.

The higher courts — after applying the right to water largely for pollution prevention in an urban context for a long time — have lately felt the urge to take it further. Thus the need for access to clean drinking water is being increasingly seen as a fundamental right in a number of recent verdicts. However, a closer look at these verdicts reveal fault-lines. For instance last year, the Andhra Pradesh high court said that right to safe drinking water is a fundamental right and “can not be denied to citizens even on the ground of paucity of funds”. Then it contradicted itself. The judgement also says that though the state is under an obligation to provide at least drinking water to all its citizens, “the limited availability of water resources as well as financial resources can not be ignored”. It could have categorically declared that the state’s failure to provide safe drinking water be declared illegal and unconstitutional. But the court felt that to issue such a direction will be only ‘utopian’.

This judicial ambivalence explains why the Rights regime in the country tends to be a Right without Remedies regime. In the above case while the court desisted from making a categorical declara-

tion; it could say clean water is a fundamental right only because of the soft nature of the operative directions it ultimately made. The courts invariably end up making mere observations, not material judgement.

The frustration that comes with seeing the right — together with its irrelevance in the lives that need them the most — has prompted jurists in the past to call Article 21 of the Constitution an instrument of legal escapism, not legal activism. Invariably, in all fundamental social economic rights — like the right to water — the argument of financial resources waters down the scope of the right. No doubt human suffering demands resources to mitigate them. But how can a fundamental right be so diluted?

Can the right to water in India meet the three conditions for a human right of being fundamental, universal and clearly specifiable? While the basic need for, and hence right to, water is univer-

sally accepted as fundamental, it really fails miserably to meet the test of specificity. It is simply because, to use the words of David Beetham, it has not been possible to specify a level below which the right to water can be said to be denied. All socio-economic rights subject to a regime of ‘progressive realisation’ can only be effective if minimum core obligations and standards are built in to them.

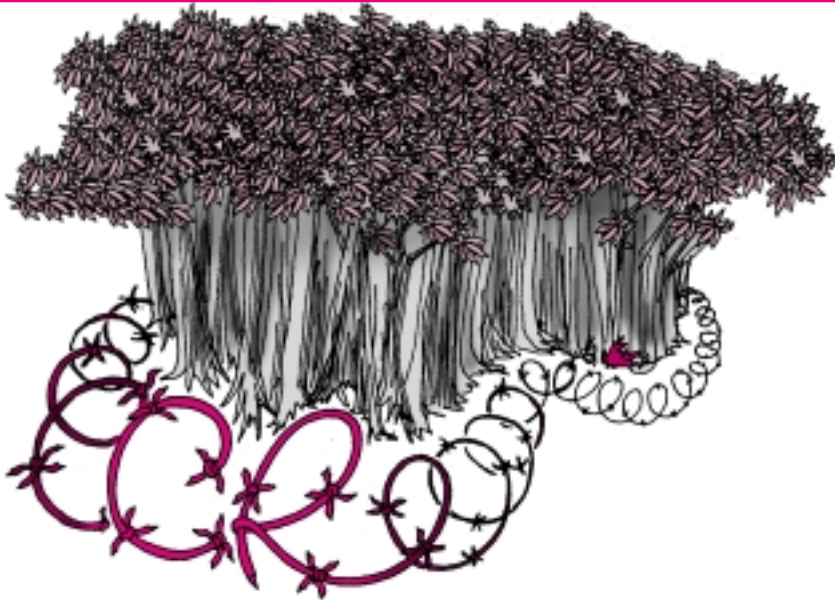
Say it is time to recognize that a certain quantity of water (litres per capita per day-LPCD) is a most basic human need and should be seen as part of the fundamental right to water. Say 40 LPCD — same as the Rajiv Gandhi National Drinking Water Mission rate to provide safe drinking water to the ‘problem villages’ and to the rural population — is a minimum requirement. If not met, as indeed is the case in many parts of the country today, who should be held responsible? Can it be enforced? The answer is no, because the minimum of 40 LPCD is not seen and understood as part of the fundamental right to drinking water. Gross mismanagement explains why in Delhi there are the VVIP areas that get 400 – 500 LPCD; the average LPCD available in Delhi even today for all 1.4 crore of its people is not less than 225 LPCD; while people living in unauthorised colonies receive just 20 LPCD! But this is a result also of a simple unwillingness to come up with more equitable water distribution policy. And an equitable water regime would not evolve unless it is enforced.

We will surely struggle to evolve the right approaches aimed at providing answers to a thirsty India. But let us not mistake the approach with the objective. In legal parlance, it can be safely said that it is the fundamental right to drinking water ‘in a defined quantity that meets the basic human need’ that alone can provide the national objective. An objective that is specific, categorical, enforceable and hence potentially result-oriented. Claim for it is merely asserting right to be human. Let the courts, which took time to interpret pollution-free water to include access to clean drinking water, settle this right by giving operative meaning to it. ■

Videh Upadhyay is a Delhi-based lawyer and Partner, Enviro Legal Defence Firms



ILLUSTRATIONS: EMKAY



Community reserves

The answer to conservation in India?



BAHAR DUTT

The 2002 Amendment to the Indian Wildlife Protection Act (1972) — the bible of the conservation movement — calls for a new category of protected areas, a ‘Community Reserve’ (CR). Recognising communities can take positive action to conserve natural resources, the law calls for accord official recognition to such efforts. Does this mean community-based conservation has finally come of age in India? Will this new category translate into an effective regime for biodiversity conservation with real power to local communities?

There is no doubt that communities can conserve. A few years ago, I was staying in a tea estate in North-east India. Local villagers there had, in cooperation with the management, protected surrounding forests for over 100 years. Yet they had no powers to protect their forest against poachers and the timber mafia, as the land was privately owned. The estate had hornbills, leopards, and over 200 species of birds. Examples such

as this abound. In Mendha village in Maharashtra, Gond tribals protect nearly 1800 hectares of forest. In Kolavipalam, local fisherfolk protect sea turtle eggs and nesting sites. In Kokrebellur in Karnataka, the endangered spot billed pelican are known as the ‘daughters of the village’ as they come once a year to nest on the trees on the village commons. None of these areas have been officially declared as ‘protected areas’.

But will the declaration of a CR provide the much-needed support and institutional backing? Or will another State-dominated machinery impose itself on healthy, grassroots-style conservation? In this regard, some safeguards have been introduced. The law calls for a ‘Community Reserve Management Committee’ (CRMC), the ‘competent authority to prepare and implement management plans for the Reserve and to take steps to ensure the protection of the wildlife and its habitat in the Reserve’. Its representatives will be nominated from the local village panchayat or gram sabha.

So far so good. But if this policy were to translate into action, all sorts of complications arise. First, the law states that once an area is declared a CR, all provisions which apply to a sanctuary then apply to the CR. Conflicts of villagers with the forest department on the use of resources inside protected areas

are legion; how will a CR ensure the same conflicts are not repeated?

Then, what about financial control? Would the CRMC be provided with funds to ensure effective management, or be expected to generate funds? If the latter, isn’t there a danger that a community might give out logging or mining rights, thereby compromising functions (conservation, ecosystemic) the reserve may traditionally have fulfilled?

But the most crucial question is: what kind of criteria must be fulfilled in order for an area to be declared a CR? In this regard, the law is silent. Perhaps rightly so; it is difficult to lay down any specific criteria for the sheer diversity of places that can be declared a CR in India. But this should not stop policymakers and the proponents of community-based conservation from some soul-searching on the essential ingredients of community-based conservation.

To my mind, the first and most crucial element for community-based initiative to be a success is security of tenure. Will a CR provide security to the people to use wildlife resources? If it does not, CRS will fail, for where would be the incentive to conserve? In the existing system, one may argue, communities do enter the sanctuary and collect NTFPs, fodder and fuel. What new benefits will a CR provide? The success of a CR, then, would lie in its ability to free local people to manage, govern and create their own rules for use of resources. The critical distinction here is between ‘benevolent concessions’ and actual ownership. Also, communities must, for instance, be small-scale to allow for effective organisation; have a significant dependence on wildlife and value the cultural significance of that wildlife.

The scope of CR is tremendous. But CRS may also fail miserably, if badly implemented. If we want to take this concept seriously, we need to know the dynamics of working with communities. Policies can only provide a framework. For practical implementation, we require to constantly work with communities, monitor the process. We finally have a progressive law. It is now up to us to just get out there, roll up our sleeves and make this work. ■

Bahar Dutt is a conservation biologist who works on issues of sustainable livelihoods

BOOK >> SEEDS OF CONTENTION: WORLD HUNGER AND THE GLOBAL CONTROVERSY OVER GM CROPS • by Per Pinstrup-Anderson and Ebbe Schioler • OUP • 2003

We remain unconvinced

SUMAN SAHAI



The good thing about this book is that it makes a clear attempt to scale down the shrill rhetoric of the GM debate. The sharp language and aggressive defence, seen in many publications on GM technology and GM crops, are missing. However, the arguments are more or less the same: alleviating world hunger, benefits to the poor and superior research targeting superior goals. These can be easily challenged.

It is not that GM technology will never deliver anything for the poor and hungry, its just that it is not doing so at present. Think: why is GM technology better accepted in the field of healthcare than food? Because it has direct and tangible consumer benefits. In the case of food, benefits are neither direct nor visible. Also, seed corporations appear to be the primary beneficiary of GM technology.

Agricultural biotechnology research is being carried out primarily in developed countries by the private sector. This research is aimed at needs of farmers in developed (not developing) countries, and rich rather than poor farmers. Hence the superior research is not targeting goals that would alleviate hunger. The book explains how GM technology can contribute to solving the problem of world hunger. A fine theory, but difficult to support through evidence. At the moment the principal GM crops available are soybean, corn, cotton and canola, which is a form of mustard. Soybean and corn are intended primarily for animal feed. The corn is also for high fructose corn syrup (a sugar substitute). But developing countries need

other crops: more legumes, cassava, millets or fodder. Not many of these are the focus of GM technology at present.

The two dominant traits that GM technology offers are insect (Bt) resistance and herbicide tolerance. Both traits cater to mechanised agriculture in industrial countries, where farm labour is practically non-existent. In 2002, over 75 percent of the global acreage of GM crops was devoted to herbicide tolerance, about 17 percent to insect resistance and another 7.5 percent to a mix-



ture of the two. Herbicide tolerance allows large-scale spraying of a herbicide to destroy weeds on large farms measuring a few thousand hectares. In India this trait is highly undesirable. Weeding provides wage labour and the

‘weeds’ are either nutritious greens for the cooking pot or additional fodder for livestock. As a matter of fact, herbicide tolerance as a trait should not be permitted in India and other agricultural developing countries. The needs of developing countries, rather, are traits like drought tolerance and salt tolerance that would enable crops to grow in arid and saline soils. But where’s the research?

In chapter three of the book, the authors make the case that to feed the growing world population, agricultural productivity has to increase and this cannot be done through existing practices. Ergo, GM technology will be necessary. But GM technology is not even targeting increased food production. Also, there are other ways to better agricultural productivity. Take India, where over half the agricultural lands are rainfed and capable of producing only one major crop. Better water management can immediately make a second crop possible in such areas. Increased availability of water is guaranteed to give success, whereas the GM route is long, expensive, and uncertain. It also raises questions about the safety of human and animal health and the environment. So what should a developing country choose?

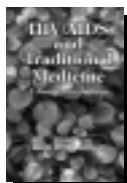
This book relies on all the old clichés regarding GM technology. It doesn’t tackle the problems of the technology, and so fails to convince. A more appropriate discussion should have included vexing questions, such as the problems arising from the implementation of stringent intellectual property rights on the processes and products of GM technology, including even research tools which makes this technology largely inaccessible to resource-poor farmers. The reader would have benefited from a more nuanced discussion on what potential GM technology had to address the problems of developing countries and what needed to be done at the level of research and implementation. ■

Suman Sahai is president, Gene Campaign

BOOK >> HIV/AIDS AND TRADITIONAL MEDICINE: A JOURNEY TO DIALOGUE • Editor *Ranjit Roy Chaudhury* • Narosa publishing house • 2002

Tapping tradition

VIBHA VARSHNEY



Indian systems of medicine could receive a big boost if they could yield a cure for just one major disease. And, theoretically, there can be a cure in traditional systems for Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS). For HIV depresses the immune system and traditional medicines are said to work by boosting immunity. This should have galvanised researchers world over into tapping traditional systems of medicine to seek cure for AIDS. But, this has not happened. Practitioners of ayurveda, unani and sidha are generally considered to be frauds by proponents of “modern” medicine. The efficacy of traditional systems of medicine remain shrouded in doubt.

The book makes a sincere effort to readdress this problem. It also tries to ascertain if hopes for finding a cure for AIDS can really be pinned on traditional medicines. It has a series of papers by traditional experts, modern practitioners, non-governmental organisation workers and policy makers. These papers were generated at a meeting held in Delhi in November, 2000. Work being carried out by Ayurvedic and other experts towards finding a cure for AIDS were discussed at the meeting. The meeting focussed on finding an interface between traditional and modern systems of medicine for the specific purpose of finding a cure for AIDS. Factors which could impinge on creating such an interface, such as the intellectual property rights regime and community rights, were also discussed at the meet.

The compilation starts well with an overview on AIDS research being carried

out in traditional medicinal systems in different parts of the world. There is a special focus on the African experience where quite a few trials on use of herbal medicine towards finding a cure for AIDS are being carried out. Results of some preliminary clinical trials being carried out in India are also presented. While some papers, such as those on studies on a neem-based contraceptive, are informative, others are basically anecdotal.

The information that this book provides will be a good guide to people intending to explore traditional medicinal systems in order to find a cure for AIDS. It could also help in removing the doubts about the efficacy of traditional systems of medicine. The book focuses extensively on analysing ancient texts to find similarities between diseases explained in the books and AIDS. And this gets repetitive at times for most papers try to find this connection. While the linkage might prove useful in the long-term, the experts could have made their papers more useful by short-listing some likely treatments, prescribed in ancient texts. Anyways, this book is a good beginning. ■

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OPINION POLL>> TRANSPARENCY INTERNATIONAL GLOBAL BAROMETER SURVEY

Mirror, mirror, on the wall...

Who's the most corrupt of them all? "If you had a magic wand and you could eliminate corruption from one of the following institutions, what would your first choice be?" The overwhelming answer seems to be political parties. So says the corruption watchdog Transparency International (TI), after a global survey that gave respondents a host of institutions to choose from. According to TI's first Global Corruption Barometer, politicians were believed to be the most corrupt in three-

fourth of the countries, and by almost 30 per cent of the people, surveyed — most notably in Argentina and Japan.

Next to wily politicians in corruption's hall of fame came the courts and the police, being given this dubious distinction by 13.7 and 11.5 per cent of those surveyed. Close behind came medical services and education.

The survey, commissioned from Gallup International, asked members of the general public in 48 countries, across all continents, which institution they would like to remove corruption from if they were given a magic wand.

In 33 countries, the public said they would most like to remove corruption from political parties, with more than half the respondents in Argentina and Japan saying so. The courts were blamed the most in Peru and Indonesia, followed by the police, who were held responsible for corruption by one-third of the people in Hong Kong, Malaysia, Mexico and Nigeria. In Bosnia and Herzegovina, Croatia, Georgia and Poland, one-fifth of the respondents selected medical services.

"The people of the world are sending a clear message to political leaders: they have to rebuild the trust of ordi-

Messy institutions (in per cent)

Country	Business licensing	Courts	Political parties
Argentina	3.6	19.2	58.2
Bosnia & Herzegovina	14.5	17.0	24.2
Croatia	12.9	21.6	18.6
Georgia	4.8	18.1	12.4
Hong Kong	1.7	8.9	15.4
India	2.0	3.8	41.2
Indonesia	5.8	32.8	16.3
Japan	8.7	3.7	51.9
Malaysia	6.8	8.5	24.6
Mexico	2.9	6.6	19.9
Nigeria	4.3	4.8	27.0
Peru	2.6	35.0	15.9
Poland	5.8	15.4	27.2
UK	2.7	8.6	41.2
USA	3.4	9.1	39.1
Overall total	7.0	13.7	29.7

Source: Transparency International

nary people," TI chairperson Peter Eigen said, "It is time to recognise the full extent of corruption among political elites in the developed and developing worlds, and the need to curtail conflicts of interest and political immunity."

As for the general optimism level, Colombians and Indonesians are the most hopeful that corruption will decrease in their countries, while a majority of Indians, Turks and South Africans expected corruption to rise. ■

The complete report can be accessed at <http://www.transparency.org>



SURVEY>> VEHICLES AND AIR POLLUTION • California • USA

California dreaming

California is famous for environmental awareness campaigns. Last month, the government banned the purchase of sports utility vehicles by the state. But what do ordinary Californians think? Sure enough, they blame automobiles for air pollution, but only other people's cars. So says a poll conducted by the Public Policy Institute of California.

Forty-seven per cent Californians think vehicle emissions were the top contributor to air pollution. However, only 44 per cent believe it is their own cars that are responsible.

Clearly, Californians love their cars, at any cost. Only a staggering four per cent think the potential for pollution should be a factor while purchasing a new vehicle. On the flip side, Californians seem to be more in favour of environmental protection, as 65 per cent residents said they would rather see environmental protection measures over economic growth, compared to only 47 per cent in a recent all-US poll. ■



BOOK NOTICE>> EMPIRES OF PROFIT: COMMERCE, CONQUEST AND CORPORATE RESPONSIBILITY • Daniel Litvin • Texere

Capital attitudes

This is the story of the spread of western-style capitalism around the world, and its effects, often unpleasant, on the local populace. On the one hand, this is a history of corporate greed. Of how big businesses have ruthlessly toyed with colonies, and then developing countries, in their sole quest for profit. From the British East India Company in the nineteenth century to United Fruit in central America and Shell in Nigeria, all have contributed fodder to the discernible anti-globalisation sentiment that is so evident today.

But alongside all that greed, multinationals have, at times, also displayed surprisingly benevolent attitudes, proving that one cannot write off globalisation as evil merely at face value. There is much more to the picture, and Daniel Litvin's study is an attempt at looking into all the issues involved. ■

ADVERTORIAL >> WHITE ASBESTOS

Express defence

The asbestos cement industry is back on the sly with its misinformation campaign. On July 15, 2003, *The Indian Express* and *The Financial Express* carried full-page "special features" trying vainly to defend the use of white asbestos fibre by the asbestos cement industry in the country.

Shockingly the Express group carried the full-page reports without any attribution and under the guise of a special feature. But it is not very difficult to guess the origins of the report. The industry's reaction is obviously propelled by a large number of reports in the mainstream media about the dangers posed by the use of all kinds of asbestos and demands from numerous quarters for a complete ban on the use of all types of the fibre.

More than 35 countries, including those in the European Union, have already banned asbestos. Australia will ban it from 31 December 2003. But the Indian industry, instead of moving towards asbestos-free products, wants us to believe that "white asbestos is safe" and that "white asbestos products do not have any risk potential to users". Scientific evidence proves the contrary.

Studies done by the World Health Organization, the United Nations Environment Programme and the International Labour Organisation all confirm the carcinogenic nature of all kinds of asbestos, including white asbestos.

The International Programme on Chemical Safety, Environment Health Criteria 203 concludes and recommends protection of human health from exposure to white asbestos because it poses increased risks for asbestosis, lung cancer and mesothelioma.

Will the Express group care to carry a full-page feature on the other side of the story too? ■



<http://www.fao.org/hiv aids/>

AIDING IN POLICY

Labour intensive farming systems with low mechanisation and agricultural input are more vulnerable to AIDS. That is one of the many small, but vital facts that we learn while getting the answers to the bigger question of how AIDS affects food security. After all, 80 per cent of the people in the countries hardest hit by the disease depend on agriculture for their livelihoods. Sick people cannot work in fields. They have to buy food, but they do not have the money. On top of that, they have to pay for higher healthcare costs. Parents die before they are able to pass on traditional knowledge about farming and local crop varieties to the next generation. Food consumption, in fact, drops by 40 per cent in homes afflicted by HIV/AIDS.

To take care of this problem, this multilingual website, maintained by the Food and Agricultural Organization of the United Nations, seeks to work as a centralised source of information on the link between agriculture and the disease. In other words, a tool to assist agricultural policy-makers, researchers, non-governmental organisations and people living with HIV/AIDS formulate a response to the epidemic. The information available on funds, labour-saving technologies, traditional knowledge, nutrition, rural institutions, social safety nets and monitoring systems to evaluate the effectiveness of ongoing programmes on HIV/AIDS can be used by the agricultural sector to revise its programmes.

This is a smartly designed site, neatly divided into the impact of AIDS and the responses to it. There are also links to other United Nations sites dealing with HIV and AIDS.

www.nandiniherbs.com

HERBAL MANNA

With contributions from various sections of the herbal industry, this interactive site will fill up the void in giving this sector a big boost. This interactive portal was set up by Nandini Consultancy Centre Pvt. Ltd., a leading chemical industry consultancy firm in Chennai. With a membership ranging from manufacturers and traders to teachers and researchers — virtually anybody in the herbal industry sector — this will be the first time that all these different sections and associations will come together on a common platform. This will go a long way in promoting the exchange of ideas among organisations and individuals involved in the sector on a global scale.

Membership to this portal costs Rs 1000 annually. This will give access to various data and information such as availability of raw material and value added products. The site will also contain analysis of data on the availability of raw material and finished products, and their export potential. This is, perhaps, a manna for exporters who can gain immediate access to international clients.

14 The Indian EXPRESS

BLAST THOSE MYTHS ABOUT ASBESTOS CEMENT

WHY THE WEST ENCOUNTERED PROBLEMS?

Can Steel Steal Asbestos Cement Markets?

THE FACTS ABOUT ASBESTOS CEMENT!

- Asbestos is a naturally occurring mineral.
- Asbestos is found in many parts of the world.
- Asbestos is used in many products.
- Asbestos is safe when used properly.
- Asbestos is not a health hazard.
- Asbestos is not a cancer cause.
- Asbestos is not a lung disease.
- Asbestos is not a respiratory disease.
- Asbestos is not a mesothelioma cause.
- Asbestos is not a lung cancer cause.
- Asbestos is not a mesothelioma cause.
- Asbestos is not a lung cancer cause.
- Asbestos is not a mesothelioma cause.

Development barrier

The eighth millennium development goal will determine the success of the other seven

► Goal 8: develop a global partnership for development

► **The catch: this goal has no time-bound, quantified indicators to hold actors to account**

► To achieve this goal, developed countries must provide poor countries more aid, faster debt relief and open their markets to them

► In 1970, rich countries pledged 0.7 per cent of their gross national product for global development. But in reality, their **official development assistance (ODA)** fell from 0.33 per cent to 0.22 per cent between 1990 and 2001

► Donor countries need to reduce the amount of tied aid, which restrains efficient allocation of assistance. **Tied aid is 25 per cent less effective** than untied aid

Goal 1: Eradicate extreme poverty and hunger

Goal 2: Achieve universal primary education

Goal 3: Promote gender equality; empower women

Goal 4: Reduce child mortality

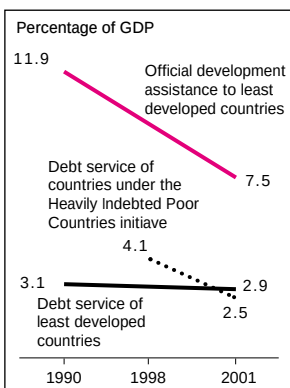
Goal 5: Improve maternal health

Goal 6: Combat AIDS, malaria and other diseases

Goal 7: Ensure environmental sustainability

Poor status

Falling aid and hardly decreasing debt level



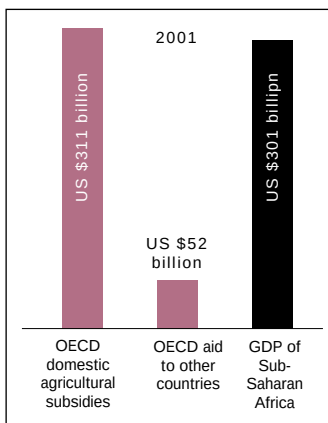
► In 1996, the **Heavily Indebted Poor Countries initiative** was introduced to reduce debt. Of the 19 countries that should have reached sustainable debt levels*, **only eight have succeeded so far. Two have returned to unsustainable debt levels**

► **Trade policies are discriminatory. Developed countries pay large subsidies** (US \$311 billion annually) to their **domestic food producers**. This depresses world prices, making developing countries' products uncompetitive

Holy cow...



Unholy truth



► In the 1990s, the **developing world faced an average tariff of 3.4 per cent** on its manufactured goods exported to **OECD** countries**. In contrast, the latter faced an **average tariff only of 0.8 per cent**

► Achieving all 8 goals will require at least **US \$50 billion a year** over the **US \$56.5 billion** available currently. **The need for rich countries to deliver is not a matter of charity but policy**

*Net present value of debt to exports ≤ 150 per cent

**Organisation for Economic Cooperation and Development

Source: Sakiko Fukuda-Parr et al 2003, Human Development Report 2003, United Nations Development Programme, Oxford University Press, New Delhi

Publications of Centre for Science and Environment

■ Making Water Everybody's Business: Practice &



Policy of Water Harvesting

Edited by: Anil Agarwal, Sunita Narain & Indira Khurana
This report provides in-depth analysis of traditional practices, technologies, policy issues and the work of governments and NGOs in the field of water management. (Pages 456)
HB: Rs 890 / US \$ 30
PB: Rs 490 / US \$ 22

■ Fourth Citizens Report (SOE-4): Dying Wisdom



Edited by: Anil Agarwal, Sunita Narain
This report provides a comprehensive overview of India's millennia-old traditions of rainwater harvesting. Triggered a nationwide interest in community-based water management. (Pages 404)
HB: Rs 590 / US \$ 20
PB: Rs 390 / US \$ 14
PB: Hindi Rs 290 / US \$ 12

■ Tanks of South India

Edited by: Prof A Vaidyanathan

This book analyses the variations between and within tanks – in the distribution of water to different segments of the command and in productivity. (Pages 178)
PB: Rs 490 / US \$ 14

■ Water Harvesters' Manual for Urban Areas: A Case



Study from Delhi

This manual is built out of CSE's experience in providing technical advice to schools, residential colonies, individual households and factories to implement rainwater harvesting

in the urban context. (Pages 35)
PB: Rs 100 / US \$ 8

■ Mileage – Green Rating of Indian Automobile Industry

In-depth analysis of the environmental performance of major players in the Indian automobile sector during the various stages of its life cycle. (Pages 238)
PB: Rs 490 / US \$ 18

■ Environmental Rating of Indian Caustic-Chlorine Industry

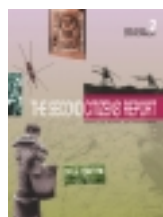
An exhaustive life cycle analysis of players in the caustic chlorine sector and its impact on environment. Deals extensively with the alarming issue of mercury pollution, its deadly effects and a comparative study with the global scenario. (Pages 334)
PB: Rs 2999 / US \$ 90

STATE OF INDIA'S ENVIRONMENT – THE CITIZENS REPORTS

■ First Citizens' Report (SOE-1)

Edited by: Anil Agarwal, Ravi Chopra & Kalpana Sharma
This report analyses the little understood relationship between development and environment, the impact of environmental degradation on individual, social groups, tribals and nomads. (Pages 192)
HB: Rs 290 / US \$ 12 PB: Rs 190 / US \$ 10

■ Second Citizens' Report (SOE-2)



Edited by: Anil Agarwal, Sunita Narain
This report describes major environmental changes in India. It's a balance sheet of India's resources and focuses attention on the effect of ecological degradation on the poor. (Pages 393)
HB: Rs 490 / US \$ 18
PB: Rs 290 / US \$ 12

■ Third Citizens' Report (SOE-3): Floods, Flood Plains & Environmental Myths

Edited by: Anil Agarwal, Sunita Narain
This report remains one of the few chronicles of the ecological change taking place in the Indo-Gangetic plains — India's most densely populated area. (Pages 167)
HB: Rs 290 / US \$ 12 PB: Rs 190 / US \$ 10

■ Fifth Citizens' Report 1999 (SOE-5)

Edited by: Anil Agarwal, Sunita Narain and Srabani Sen
This report documents the extraordinary initiatives in the rural sector and the crisis the urban sector faces. As per The Economist London "A remarkable attempt to put together all the different aspects of the environment, stand back, and see how the picture looks". (Pages: Part I-440; Part II-256)
HB: Rs 1590 / US \$ 59 PB: Rs 590 / US \$ 33

■ Global Environmental Negotiations (GEN-1):



Green Politics

Edited by: Anil Agarwal, Sunita Narain, Anju Sharma
This book provides a close analysis of important environment related conventions and institutions from their origins, and demystifies the politics of 'saving the environment'. (Pages 409)
PB: Rs 590 / US \$ 31

■ Global Environmental Negotiations (GEN-2): Poles Apart

Edited by: Anil Agarwal, Sunita Narain, Anju Sharma & Achila Imchen
The second in the series this book includes updates on the issues dealt within the first report, Green Politics. This report has also new chapters on five conventions and institutions. (Pages 441)
PB: Rs 690 / US \$ 33

■ Global Warming in an Unequal World

Edited by: Anil Agarwal, Sunita Narain
A case of environmental colonialism. (Pages 34)
PB: Rs 30 / US \$ 6

■ Slow Murder: The Deadly Story of Vehicular Pollution in India

Edited by: Anil Agarwal, Anju Sharma & Anumita Roychoudhury
This report discusses the issue of smog and smog makers with shocking revelations on vehicular pollution. (Pages 148)
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Edited by: Anil Agarwal
A series of articles discuss the effects of environmental pollution on public health – a must have. (Pages 128)
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Edited by: Anil Agarwal
This report analyses the proceedings of CSE national seminar on economics and environment discusses the strong bondage between economic growth and environmental sustainability. (Pages 388)
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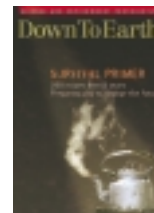
■ Natural Resources Links

Directory of Indian government departments and institutions dealing with natural resources with key contact details and area of specialisation. (Pages 454)
PB: Rs 490 / US \$ 14

■ Health Links

Directory of experts on environmental health in India and overseas with contact details and area of specialisation. (Pages 70)
PB: Rs 65/US \$ 5

■ Survival Primer – Down To Earth Special Issue



Contains prominent articles collated from 200 issues of science and environment fortnightly, Down To Earth, from 1992 onwards. (Pages 240)
PB: Rs 290 / US \$ 10

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