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districts are listed as Naxalite affected. Like any military organisation it conducts periodic military training including guerilla warfare skills for its cadres.

Now, even women are enthusiastically joining the Left extremists ranks. Use of women cadres to stall police action and raids have been a favourite ploy of Naxalite groups. But their use as armed, trained combatants and decoys began in earnest only after the Peoples Guerilla Army (PGA) was deployed by the PWG in Bihar after December 2, 2001.

One major reason why the Naxalite movement has grown is lack of will to meet the challenge politically. All the political parties have become redundant in the affected districts, thanks to PWG intimidation and other violent tactics. As many as 800 VIPs in Andhra Pradesh provided round the clock protection of PWG leaders.

Successful governments have, unfortunately, treated this as merely a law and order problem. This flawed diagnosis has compounded the ailment. Political leaders of all hues including many leaders from ruling Telugu Desam Party say that the problem can not be solved unless the socio-economic problems are taken care of.

"Poverty, unemployment and exploitation are breeding grounds for Naxals. How do you tackle that by arming the police with more powers and more weapons?" asks

rage and reason

Naxalites profit from people's anger against forest laws. With 15 per cent of India's forests under their control, Naxalites wage a war using a simple weapon: forest mismanagement

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COVER PHOTO: NILMADHAV PANDA



Unravelling the unknown

The article 'Fevers Of Unknown Origin' (Down To Earth, Vol 10, No 12, November 15, 2001) has evoked responses from a wide cross-section of readers. A few of them are produced here

It was a pleasure to read your article. I am a microbiologist and my area of research focuses on disease transmission through vectors and their crossing over into human population. Many of these fevers are recurrent fevers and have persisted in a single foci, while others like Ebola have emerged suddenly in unrelated parts of Africa. My research has shown that evolution pressures exist — one at the vector level and the other at the pathogen level. Often during this gradual change, there develops an incompatibility between the two. An example of this is Ukiriri disease, a rare mosquito-borne haemorrhagic fever in African antelopes caused by a Babesia-like micro-organism. In case of this disease, cattle that has been encroaching on savannahs have developed immunity to it. When these rangelands were restored with the original antelope population, both the vector and the pathogen had lost their infectivity barring one species, the eland. Earlier the pathogen could infect almost all species of ungulates.

RUPASURESH KUMAR
Nairobi, Kenya

Down To Earth welcomes contributions from readers. You can send your contributions to Anil Agarwal, Editor, Down To Earth, 41, Tughlakabad Institutional Area, New Delhi - 110 062.

As a general physician in Mumbai, I have been investigating the emergence of leptospirosis for the past five years. To many physicians, even this obvious but rarely occurring disease has become a major challenge. Broad spectrum antibiotics are the only effective method we have used to curtail the spread of an epidemic. But you are right in pointing out that after curtailing the infection, we do very little to identify the causative agent. This can definitely lead to resistance in a pathogen even before we know about its nature and how best we can control it.

A K NIRMAL
Mumbai, Maharashtra

My compliments to Down To Earth team for its diligent field work in covering unknown fevers in India. You are right in pointing that the medical institutions like Indian Council of Medical Research (ICMR) and National Institute of Communicable Diseases (NICD) have done little to carry out any extensive field survey. I was part of the first team by the Virus Research Centre, Pune, which was responsible for setting up field offices in Arcot and Jodhpur. One interesting fever that we discovered was called the 'Jamshedpur fever' — a violent encephalitis seen in 1955-56 among adolescents in the industrial township of Jamshedpur.

I am surprised that you did not make a mention of it. In your article you mentioned the rapid evolution of virus and crossing over as the main reason for their sudden emergence. My belief is that most these viruses have a chance encounter and they often develop new weapons or improve upon existing mechanisms to cause infections. Malaria is one such example.

S K BAGCHI
Nagpur, Maharashtra

I would like to draw your attention to some factual mistakes in your story. Articles published in your magazine are often discussed in the science club of our school and we do not expect such errors.

In the coloured box on page 32, the temperature should have been 68-77 degree F not degree C. In the table on page 33, malaria is shown as a viral disease whereas the fact is that is a protozoan disease. Also, Q fever is rickettsial disease that rarely spreads by ticks. It spreads mostly through pathogens in urine, faeces, milk and flesh of animal. It can also be contracted by inhaling dust.

VINOD BHARDWAJ
Chittaurgarh, Rajasthan

Reply

You are right in pointing out that the temperature should be in degrees F and not degrees C. Regarding the second error, we have clarified in the text that most pathogens, especially viruses, evolve faster. But in the table, we inadvertently used virus in place of pathogen. Different types of malaria and other mosquito-borne fevers also evolve quickly and use this path of transmission. The caption, therefore, should have read: 'Mechanisms that a pathogen adopts to invade a human host'.

You are also right in pointing out that Q-fever is transmitted in cattle and goats and is largely an occupational disease in humans. Some recent evidence shows that Q-fever can occur through tick bites as shown by the Virus Research Centre in 1955-56. But as pointed out by you, the mode of transmission largely remains infected animal products.

Your article came across as a

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sensationalist story that raised more dust than necessary. In a country where more people die because of hunger and basic diseases like malaria and lung infections, I don't think your esteemed magazine needed to devote a cover story on a trivial issue like fevers. I hope to see more important issues on the cover of *Down To Earth* in the near future.

R J GUPTA
Jaipur, Rajasthan

We are a Chennai-based NGO and work on health of the poor in slum areas of the city. We have encountered several incidents of unknown fevers here, especially during heavy rains. You have rightly pointed out that there is a total apathy on part of the research organisations and doctors towards recognising these important issues of public health. Our repeated pleas to authorities in the municipality and civil hospitals have fallen on deaf ears. We hope that your story will be able to stir our lazy bureaucracy and complacent research community into action.

R V SESHAGIRI RAO
Healthforpeople@rediffmail.com

I was not aware that fevers could be so strange and diverse in their origin. I am associated with an NGO that works in rural communities of Maharashtra and Chhattisgarh and we can identify with seasonality of fevers that your article vividly describes.

ATUL RANALKUR
jagruiti_india@indya.com

As a subscriber of *Down To Earth*, I am very pleased to see a detailed story on fevers. I have worked as a dermatologist in Delhi for 30 years and during this period I have seen several cases of strange skin ailments accompanied by fevers. I am surprised that none of your stories mention skin abnormality of any kind with these fevers.

L K SINGHVI
Faridabad, Haryana

Your story on fevers is interesting for a pathologist like me. I have been working as chief pathologist in the Kanpur Civil Hospital for 12 years and have

encountered several unknown pathogens. Like your story said, we do not have a protocol to identify, control and even treat such fevers. I am sure if we treat unknown fevers with strong antibiotics we can run into the danger of imparting resistance to them even before we can identify them. Your report is a very timely one.

R S SHARMA
dr_rsharma@hotmail.com

I work as the associate professor at University of Utah and have been researching febrile fevers in Africa. I enjoyed reading your story. It is the first popular science article to unify the evolution of new viruses and emerging fevers, so lucidly. The map on fevers across the world is a very useful teaching tool for me. I look forward to reading more of such stories.

JOHN M SEAGEL
seagel@crds.net

I work as an entomologist with the United States Development Authority (USDA). I found your article very interesting and believe that it has linked the issues of environmental change, rapid evolution and the emergence of viral fevers in an interesting fashion. I have a few submissions to make. Your article does not mention the role of Centres for Disease Control (CDC) and other institutions like USDA in controlling the emergence of epidemics in Africa and Latin America. It is surprising that you have reported a higher concentration of fevers (based on your map) in India than certain parts of Africa. Surely there is bias in the your assessments, especially on the choice of databases and reports you have used to map the epidemics.

LAURA LACEY
llacey@yarl.ars.usda.gov

As an epidemiologist I found your feature very informative which was able to convey the complex theory of bottlenecks and cross-over simplistically. It is alarming that medical bodies and the government have not paid much attention to this alarming problem.

JEAN PAUL CHARLES
jpcharles@pasteur.fr

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Programme plugged



QUITE frankly our friends in government would be right in saying that they are damned if they don't and even more damned if they do. But what can we

say. It is truly amazing how our government agencies learn so little about how programmes can be made to work. Every idea is churned in the same mindless cauldron of bureaucratisation and procedures and comes out exactly like the last: sterile and dead. Legislate, ban and then forget implementation. In the process alienate the very people who will be the custodians of the idea.

What makes me so angry? The grouse is the mess being created by the Central Groundwater Board (CGWB) in promoting the idea of rainwater harvesting in our cities. It is an idea we pushed and that is why it particularly angers me to see that instead of building proponents for this idea, the government agency in its zest will probably bury it for good.

We got a taste of what is to come recently. At a meeting organised by CGWB to "teach" people about how to harvest rainwater, there were no listeners. Only angry residents. They claimed that the government legislation to make rainwater harvesting mandatory in all buildings is another form of harassment. They are desperate for water, their groundwater levels are falling but they have turned against rainwater harvesting, fearing that the government dictate will lead to more problems with the local inspectors.

It has always been clear to me that urban rainwater harvesting will require a strategy that has different components. We have to recognise that just passing a law is not enough. It has to be supported with a massive campaign for public awareness and with hard policy actions, which provide incentives and disincentives for its effective implementation. In this case the incentives will have to come in the form of fiscal measures which support households to capture their rain, and the disincentives

in the form of pricing of water and supportive urban taxation policies.

Chennai, for instance a city with dire water shortages, was one of the first to legislate that rainwater harvesting would be mandatory in all new buildings. But a survey carried out by the Madras Institute of Development Studies for us showed that most residents living in these buildings with rainwater harvesting had absolutely no idea about this system, which the builder was supposed to have built in order to get the completion certificate. These are fragile systems and, without active involvement of building residents, will get silted and choked in no time.

A similar story was repeated in Delhi. The Supreme Court ordered wisely that rainwater harvesting should be carried out in the Vasant Kunj area of Delhi — a housing conglomerate built by the Delhi Development Authority (DDA), which howls for water. Residents of this affluent colony spend over Rs 1000 each month, buying water from private tankers. The DDA was given charge of implementing the project to harvest rainwater. It was clear from the start that unless local residents were involved and were asked to contribute in part to its funding, the effort would build another dead structure.

But nobody knew how to engage local residents. The government agency accused residents for not wanting to contribute to the project and their resident associations for being politicised and divided. On the other hand, residents accused DDA for just not wanting to involve them in the programme. A stalemate continued on the issue of sharing the costs. Finally, it was agreed that the project would simply divert the

water of the existing stormwater drains into a recharge pond, which DDA would construct. At a meeting with resident associations it was agreed that drawings of the storm water drains of the building complex would be made public — through pamphlets and posters — so that residents knew about the system of rainwater harvesting and valued their drains. But then even this solution was defeated by officialdom: the drawings could quite simply never be located.

Finally, as with most other such ventures, taxpayer's money was spent by DDA to build the pond to divert the rainwater, all to meet its obligations to the court. But what good it will do is anybody's guess.

A key issue that has to be addressed is why people would invest their money in harvesting rain, when the government is responsible for providing drinking water and it does it so dirt cheap. The answer would therefore be to design a fiscal package, which promotes this technology as it provides critical benefits to the city. For instance, in Germany, the households are taxed according to the amount of stormwater they discharge into the municipal system. The tax is calculated on the basis of the paved area of their building. It provides an incentive to the resident to store or recharge the rainwater to avoid being taxed. The state also benefits as it saves on its stormwater drainage costs. Similarly, in other parts of the world, property taxes are modified to give the water harvesters an advantage.

All this can only be done if we make people aware of the value of the raindrop. But for our government agencies it would mean that they would first have to value the participation of people — not just in words but also in action. ■

— Anil Agarwal



Urban rainwater harvesting will require a strategy that has different components. We have to recognise that just passing a law is not enough

LEADER

Reason to celebrate?

Biodiversity bill clears another hurdle but is the way clear for its passage?



THE biodiversity bill has finally been approved by the Parliament standing committee on science, technology and the environment. The last time the bill made it to Parliament in May 2000, it was referred to the parliament standing committee for further deliberations.

Having a national biodiversity became essential after India signed the Convention on Biological Diversity (CBD) in June 1992 — a global treaty to protect the planet's genetic resources of microbes, plants and animals. The treaty recognises that biodiversity is a sovereign resource that needs to be sustainably utilised and that the benefits arising out of the use of community's traditional knowledge be shared with the community. As a party to CBD, India is obliged to come up with a national legislation if at all its sovereign rights over biodiversity are to be recognised. According to the bill, a National Biodiversity Authority will be set up to regulate activities and sustainable use of biodiversity and issue guidelines for access and equitable benefit sharing.

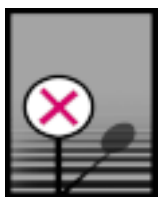
One of the significant comments of the standing committee

on the bill has been to ensure that the centre has control. The centre wants the authority to direct states if it feels that the biodiversity in the state is being threatened by 'overuse' and 'neglect'. With the centre not being willing even to hand over power to the states, how can it be expected to hand over benefits to poor communities? Bureaucrats have also found involving communities and handing over what is rightfully theirs a big problem. While bureaucrats cite definition of a 'community' as a main hurdle to share benefits, surely the problem is not unsurmountable.

The bill has certainly been drafted to death. It has been seven years now since India has ratified the CBD and four years since the first form of the bill has been drafted. Though unimaginative, a bill on biodiversity is certainly welcome. It is important that the bill is passed and that the loopholes are plugged later. Conservation can only be ensured through utilisation and so 'utilitarian conservation' rather than 'protectionist conservation' should be the approach. To ensure that the benefits really reach the poor, it is important that the committees formed be as representative as possible and not end up being toothless to make the whole exercise meaningless. ■

Ban the ban!

Wildlife authorities must think carefully before imposing any blanket ban



OUR wildlife department has done it again. One more ban added to the kitty of wildlifers — on 60 species of marine life, including sharks, coral and conch shells. And, as expected, there's a major row that's erupted over the ban. Fisherfolk are unable to comprehend how on earth they are going to identify the 60 species and avoid netting them. But above all, were they ever consulted before this blanket ban? Yes, consultations were held, but afterwards. Would it be wrong to call that as just another cruel joke on the people?

And this is not the first time such a ban has been declared without a thought about its repercussions or whether it would work in the first place. Take for instance, the ban on sandalwood or ivory. One very much appreciates the need to conserve and to prevent mindless destruction of a limited resource. But banning has never worked. If ban on sandalwood generated smugglers like Veerappan, that on ivory saw our tuskers decimated and gory tales like the recent one from Corbett National Park.

What we witness in every such instance of ban is a total lack of public involvement. Moreover, the decision is invariably not based on scientific study, which makes the ban stand on even more tenuous grounds. It thus becomes very difficult to justify to the people involved, especially the local people whose livelihood is directly impacted. What such a ban invariably ends up doing is to alienate the people from wildlife, often turning them against the very species one hopes to conserve.

The answer lies not in erecting a barrier between the local people and wildlife, a link that has survived generations, but to evolve a system through them. The best way to manage our natural resources is to make the locals the custodians and not enemies of wildlife. Why not seek their opinion too and in coordination with them try and evolve a method of regulation. For instance, a quota system to regulate fishing. Or alternative resources to meet their livelihood, particularly for artisans. True, any solution is beset with problems but there is nothing like the people regulating themselves rather than toeing the line drawn by the government. Why not give more credibility to the wisdom of the people. Let them decide. ■

Hope in sight

US appeals court rules in favour of Bhopal gas victims



Bleeding agony: the Union Carbide plant in Bhopal continues to take a heavy toll

FOR 17 years they have fought two grim battles — one in court and the other for life. Finally, the protracted struggle of the five lakh people devastated by the lethal gas leak in Bhopal in December 1984 appears to be bearing fruit. At least on the legal front.

On November 16, 2001, the US second court of appeals in New York (NY) ruled that Union Carbide — the American chemical conglomerate that was responsible for the worst industrial disaster in the world — and its then chief executive, Warren Anderson, are answerable for criminal charges in India. Significantly, the court has also fixed responsibility for long-term medical, social and environmental liabilities

arising out of the incident. This is the first time that the ecological damage caused by the disaster has been brought under judicial scrutiny.

Ironically, non-governmental organisations (NGOs), and not Indian authorities, took up the victims' cause. A report entitled 'The Bhopal Legacy', brought out by international NGO Greenpeace, forms the basis of the suit. It scientifically confirms that massive environmental contamination has taken place at the Union Carbide India Limited (UCIL) site where large amounts of toxic material are still present. Meanwhile, the research conducted by the government continues to be kept under wraps (see box: *Stifling secret*).

The case was filed against Union

Carbide and Anderson in November 1999 by a group of seven individual victims and five activist organisations. The plea had, however, been rejected by the southern district court in NY in August 2000. In November 2001, a judgement was passed on appeal in favour of the aggrieved party. The suit was filed in the US because there is no legal provision in India under which compensation can be claimed for environmental damage, says Abdul Jabbar, convener of Bhopal Gas Peedit Mahila Udyog Sangathan, a self-help organisation created by the victims.

Culpability has been established on the part of Union Carbide for all the fall-outs from the methyl isocyanate (MIC) leakage. But, in effect, Michigan-based Dow Chemicals Company will be liable to pay up because Union Carbide is its wholly owned subsidiary now. "Given that the parent company has substantial assets in India, the goal of securing justice now seems more real," says Satinath Sawangi, Bhopal Group for Information and Action, a support body for the victims.

The US court has suggested that India could use the extradition treaty to bring Union Carbide and Anderson to appear before the Bhopal district court. The Union government is yet to react to the development. Anderson has been evading Indian courts since 1984.

The NY court's order, a result of the victims and their supporters' steadfastness, is half the battle. The least the government can do is expeditiously take the case to its logical conclusion. ■

Stifling secret

Researches into the cause of the Carbide catastrophe are yet to see the light of the day

What were the ingredients of the deadly cocktail that tank no. 610 at Union Carbide India Limited's (UCIL) Bhopal plant spewed on December 3-4, 1984? So potent was the mix that 3000 lives were lost then. The toll is now 11,000 and mounting. Yet the victims and medical fraternity are in the dark. UCIL had a two-word escape clause to avoid divulging details: trade secret (see *Down To Earth*, UCIL's end-game,

Vol 6, No 12, November 15, 1997). But then nothing better could be expected from the perpetrators of what is often referred to as the 'industrial Jallianwala Bagh'. It is, however, lamentable that the Union government too has not revealed the findings of its 25 project studies. Its two-word alibi: official secret. Indian Council of Medical Research deputy director general Narinder Kumar is unsure, but feels the results have been published. But the US appeals court has come to the victims' rescue, allowing them access to Union Carbide's documents. Independent studies indicate that methyl isocyanate can react with water at high temperatures to produce 65 chemicals, most of them toxic.



BEST to better: Mumbai's bus service provider told to switch over to CNG

SUDHAKAR OLIVE

CNG drive reaches Mumbai

Deadlines set for public transport vehicles to shift to green gas

AFTER Delhi's public transport system switched over to compressed natural gas (CNG), it is Mumbai's turn to receive a green makeover. In this case, too, the judiciary is the catalyst for change. The Mumbai High Court has given an ultimatum to owners of all 15-year-old taxis and 10-year-old autorickshaws to either convert their vehicles to CNG by March 1, 2002, or stop plying them. It further requires eight-year-old taxis and autos to go green by January 1, 2003. The order sounds the death-knell for the highly polluting diesel in the metropolis. While 15-year-old commercial tempos and trucks have been asked to fall in line by January 1, 2003, eight-year-old ones get time till January 1, 2004, to clean up their act.

Even as the verdict appears to be in favour of CNG, the Brihanmumbai Electric Supply and Transport (BEST) — which runs the city's bus fleet — has filed an affidavit in the court seeking permission to ply Euro 1-compliant vehicles. The corporation has cited its inability to afford new CNG buses. The court has reacted by observing that "if BEST does not have the money to buy clean buses, let private players come in".

The High Court has also pulled up Mahanagar Gas Limited (MGL) for not being able to set up an adequate number of CNG dispensing stations. MGL has managed to install only three of the five stations that it was asked to set up. MGL claims that delay in land allotment has prevented it from setting up the two gas stations. "We are hopeful of meeting the March 2002 deadline set by the court," says Uday Kiran of MGL.

Another vexatious issue is the availability of the green fuel. Environmentalists such as Debi Goenka — who was a member of the committee that recommended the gas for Mumbai — feel that the Union ministry of petroleum and natural gas is creating an artificial scarcity like it has done in Delhi. ■

ULSD dearer

High demand for clean diesel in Europe sends its price zooming

A RECENT spurt has been witnessed in the demand for ultra low sulphur diesel (ULSD), with several European countries switching over to the green fuel (containing 50 parts per million of sulphur). The resultant shortage has pushed up ULSD prices on the Rotterdam (Netherlands) barge market by US \$20 a tonne.

The price of ULSD stood at US \$ 54 over the London IPE (International Petroleum Exchange) gas oil futures, compared to the regular diesel quotes at

Phase-out postponed

Delhi government fails to rein in diesel bus operators

Private operators have bulldozed the Delhi government into indefinitely deferring the phase-out schedule for diesel buses. As against a target of 2788 buses, only 727 have gone off the roads in December 2001.

On October 18, the Supreme Court (SC) had directed the city government to phase out 8881 diesel buses by January 31, 2002, and replace them with compressed natural gas (CNG) vehicles. Subsequently, in a hearing on the issue on December 6, Jatinder Moudgil, president, All-India CNG Bus Operators' Association, contended that contrary to claims even a limited number of diesel buses had not been barred from plying.

In a related development, the SC gave the Environment Pollution (prevention and control) Authority eight weeks to furnish information on whether surprise inspections had been conducted at petrol pumps, oil depots and tankers to check for spurious diesel.

The apex court issued two other significant directives:

- No heavy, medium and light goods vehicles plying on inter-state routes would be allowed to pass through Delhi from January 15, 2002
- Tamper-proof fare meters should be installed in autorickshaws and taxis by February 1, 2002

around US \$20 over the IPE — a price gap of US \$34 between two qualities of diesel. Oil traders say that the difference is twice as much as the tax break introduced by Germany in favour of ULSD and nearly three times as much as the tax advantage in Belgium.

European oil traders said refiners had been caught off-guard by Belgium's impending shift to the gas as traders began moving their systems to ULSD some time before the actual deadline. While Belgium is going in for an immediate change, many other European countries such as Germany, Sweden, Finland, Denmark, the Netherlands and the UK are also moving to ULSD. ■

Pink Floyd goes green

Rockers strike an ecofriendly chord

It's time we stopped being comfortably numb about the environment. Rock band Pink Floyd certainly isn't. Their latest album — *Echoes* — is primed to create four new forests in India (Bangalore), Scotland (Dryhope Burn), Mexico (Chiapas) and the US (Louisiana).

The two-CD retro, comprising some of the group's greatest hits, will be made 'carbon dioxide (CO₂) neutral' with emissions arising out of its recording, production and distribution being offset by planting native trees in indigenous forests. The number of copies sold will be reflected in the number of trees planted.

CO₂ is a greenhouse gas, which prevents heat from escaping the Earth's atmosphere causing global warming. Plants absorb CO₂ and turn it into oxygen and carbon. While oxygen is released into the atmosphere, carbon is stored in the form of wood. About 50 per cent of the tree's dry weight is due to carbon.

Future Forests, a consultancy service, is assisting Pink Floyd in this initiative. It has measured the amount of CO₂ emitted during the production of this album, and estimated the number of trees to be planted to absorb an



In tune with nature: Pink Floyd belts out pollution-free music

equal amount of carbon dioxide over their lifetime. The music industry has been among the first supporters of this four-year-old idea of Future Forests. Bands such as Atomic Kitten and Pet Shop Boys have also endorsed this eco-friendly method.

It seems the success of Pink Floyd's *Echoes* will benefit both us and them. They stand to make money. And we get to breathe easy.

Proposal rubbished

Delhi government draws flak over gasification plant

A RECENT in-principle clearance to a gasification plant in Delhi has fuelled a major controversy. While environmental groups are up in arms about the "polluting and extravagantly expensive" project, Energy Developments Limited (EDL) India — a subsidiary of EDL Australia and the company that is setting up the plant — claims the technology is clean and tested. The Union ministry of non-conventional energy sources (MNES) is maintaining a studied silence as it is yet to get a detailed report. And the Municipal Corporation of Delhi (MCD), smarting from the Timarpur incinerator fiasco (it failed on both economic and ecological fronts), is going over the proposal with a fine-tooth comb.

The project is a part of the waste-to-energy (WTE) programme, wherein refuse that is burnt or thermally decomposed generates energy. Subject to getting the go-ahead, it will fall within the ambit of the MCD. The Delhi Government would provide the land

and the MNES is to give the final nod. To be sited in Ghazipur, the 21-megawatt gasification plant will process 1,000 tonnes of waste daily.

It has been contended that the very process employed in such plants is questionable. Gasification is the thermal decomposition of organic matter in an oxygen-free atmosphere, producing gas. "In actual practice, gasification does not occur in the complete absence of oxygen. Rather, it takes place merely in an oxygen-depleted environment. The oxygen which is still present among the molecules of waste produces carbon monoxide, dioxins, furans and particulates," says Madhumita Dutta, central coordinator of New Delhi-based non-governmental organisation (NGO) Toxics Link. "These are overkill technologies that cause more problems than they solve," she adds.

"What is inexplicable is that they also run contrary to the civic authorities' policies. On the one hand, the MCD is propagating waste segregation with the assistance of NGOs and on the other it is opting for a plant which functions on the mixed waste principle," points out Neena Gulabani of Asian Centre for Organisational Research and Development (ACORD).

Environmentalists are astounded at not being included in the planning phase

of the project. "Consultants from abroad were part of the meetings, but experts within the country had no representative," laments Ravi Agarwal, coordinator of NGO Srishti in New Delhi.

NGOs are also concerned about the sops being doled out to multinational companies. "Why are WTE projects getting subsidies, when compost plants do not enjoy such benefits? Why is the government not thinking of reviving compost plants and using the compost to reclaim degraded land in the country? Why not invest Rs 200 crore in a solar-powered plant, which is sustainable and non-polluting?" are Agarwal's posers to the administration. Sunand Sharma, managing director of EDL, however, denies getting any subsidy from the government. The company plans to involve communities while preparing the project and conduct an environment impact assessment (EIA), he says and adds that the price of power would be in accordance with the rules of the Electricity Regulatory Commission. But Uttam Vaswani, joint director (sanitation), MCD, feels that the authorities are chipping in financially. "We are obtaining land worth more than Rs 200 crore from the Delhi government on the company's behalf to set up the plant. The Timarpur land was leased out for 30 years and is lying idle. We need to be

more careful this time," he says.

It appears that the most prudent way to resolve the row would be for all parties concerned — NGOs, authorities, industry and the civil society — to evolve a broad consensus on a long-term waste management policy. Any intransigence may result in yet another opportunity going down the drain. ■

Felling halted

Curbs on extraction of timber in Kerala's Wayanad district

THE Kerala High Court (HC) has directed the collector of Wayanad district to prevent extraction of timber from plantations in the region. The official has been told to ensure that various state departments do not abet the cutting and removal of trees from both forests and *patta* (title deed) land in Wayanad. Earlier, the court had allowed the divisional forest officer (DFO), south Wayanad, to remove 517.523 cubic metres of timber that had already been felled, in accordance with the Wayanad Colonisation Scheme.

The ruling came in response to a writ petition initiated *suo motu* on the basis of an anonymous letter, relating to the thinning of plantations, received by the HC. The petition has been referred to

a division bench. It has been alleged that irregularities have taken place in the grant of *patta*. Title deeds are said to have been given to unauthorised occupants who have resorted to large-scale cutting and removal of valuable trees.

Notices are being issued to various officials of the area, asking them to show cause why the loss incurred by the state and environment because of their connivance with the illegal occupants should not be recovered from them. The HC also declined permission to the Timber Merchants' Association to remove lumber and other products collected from private or *patta* lands in Wayanad district.

The government pleader submitted that the state had taken steps for filing an appeal before the Land Reforms Appellate Tribunal challenging the order of the Land Tribunal in respect of the improprieties.

The court observed that *patta* had been issued to trespassers who could not be called tenants in any sense of the term. It held that until these aspects were considered, the plea of the traders could not be allowed.

The DFO was, however, permitted to carry on silviculture (forest management) work. This, in effect, means that thinning of plantations and extraction of timber as stipulated in the working plan for 2000-01 could be carried out. The judge ruled that this concession was being made since silviculture thinning was necessary for the healthy growth of trees and in view of the auction proposal of the timber so obtained. ■

Wielding the axe: Kerala High Court stems rampant tree-cutting



AMIT SHANKER / CSE

Stir over project site

Steel plant plan opposed by villagers facing ouster

EVER since 2000, Bastar district in the fledgling state of Chhattisgarh has been on the boil. The reason for the growing unrest: a State government proposal to set up a Rs 300-crore steel plant project of the National Mineral Development Corporation (NMDC) in the Nagarnar area of the district. The administration, instead of ironing out the problems of locals who are likely to be displaced, has unilaterally decided to go ahead with the plan. Consequently, the affected villagers are fighting it tooth and nail.

Recently matters came to a head when the police resorted to lathicharge and firing on a restive mob at Jagdalpur, the district headquarters of Bastar. The violence left 60 injured. The protesters were demanding the unconditional release of three of their leaders who were taken into custody, allegedly on cooked-up charges. "The agitation was silent and was led by women. The police firing highlights the insensitivity of the local administration towards the people," alleges Satyanarayan Sethia, convener of Kisan Sangharsh Samiti (kss), Nagarnar, and one of the three leaders arrested. The authorities, however, deny the charges.

A total land area of 413.18 hectares (ha) has been approved for acquisition. At least 303 people, mostly tribals from four villages, are being asked to leave. "They are promising me a job in lieu of my 2.4 ha of land, but I do not want to be a labourer. Since I am illiterate I will not land a good job. How will I then feed my two children and myself?" says Gurupatta, a widow of Amaguda village.

Under the fifth schedule of the Constitution it is mandatory for the acquisition process to be in consultation with the *gram sabha*. "This has been completely ignored. In all the meetings with the collector, the four gram sabhas have rejected the proposal for land acquisition," says Sethia. Villagers claim that *gram sabha* registers have been tampered with and fake signatures have been affixed in the list of those who are

ready to give their land. "These allegations are completely baseless," says Richa Sharma, collector, Jagdalpur. She says that the interests of the villagers will be safeguarded. But the people are in no mood to reconcile.

On the environmental front too unanswered questions remain. BD Sharma, a tribal affairs expert who is leading the movement, says: "Getting environmental clearance is mandatory before the process for land acquisition begins. But NMDC hasn't done that." However, according to Kumar Raghavan, Chief of Public Relations, NMDC, the Technical Development Board of the State government has given its nod to the project.

Even as the Kisan Sangharsh Samiti is planning another rally in Jagdalpur, the Chhattisgarh government is in a fix. The administration is contemplating shifting the steel plant site, says state industry minister Vidhan Mishra. Incidentally, if it happens, this would be the second such relocation since 2000 when the government bowed to the people's demands and shifted the plant's location from Geedam in Dantewada district to Nagarnar. ■

Tried and (lab)tested

Bengal varsity set to analyse and authenticate herbal drugs

TO CLEAR the prevailing doubts about the efficacy of herbal drugs, a special centre will be set up at Jadhavpur University in West Bengal. This first-of-its-kind section will examine the validity and authenticity of the herbal drugs produced and marketed by different firms. The Union and state governments have not only given their go-ahead to the proposed centre, but agreed to provide all assistance for the same. The new centre is likely to be established within a year. It would be integrated with the university's department of pharmaceutical technology.

"One of the basic problems with herbal medicines is the fact that their effectiveness is not proven," says Tapan Chatterjee, researcher with the department of pharmaceutical technology.

Apart from undertaking research to ascertain the medicinal uses of various plants, the centre would also verify the claims made by herbal drug manufacturers. The drug would be subjected to quality tests, reveals Ashoke Nath Basu, vice chancellor of the university.

Herbal drug manufacturers interested in checking the utility of the medicine would approach the centre, where the drug would be tested for a nominal charge. What's more, if the claims are verified, the medicine would be issued a verification certificate by the centre.

"Such a centre is essential to boost exports of herbal medicines as it would keep tabs on the quality of our product," says Akhilesh Sharma, chairman of the Global Society for Promotion of Ayurveda, New Delhi. But he hopes that the department of Indian systems of medicine would also be involved to lend weight to the authentication process.

With allopathic drugs likely to become dearer in the future, the lower-priced herbal drugs have a big market that needs to be tapped. And the proposed centre can help do that by restoring the confidence of the people in quality herbal medicines. ■

Advertisement

Yearbook of International Co-operation on Environment and Development 2001/2002 (9th edition)

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US / GENOMICS

Moral dilemma

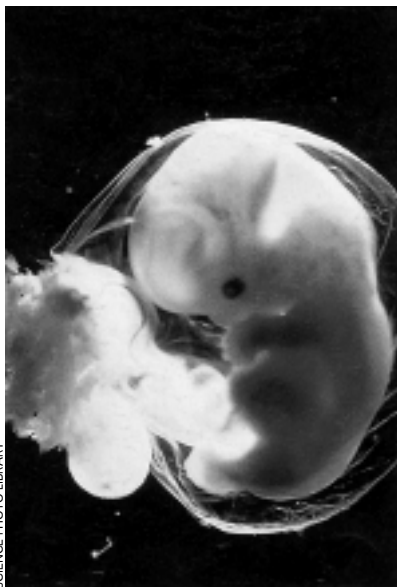
Mixed reaction greets cloning of human embryo

IT WAS an experiment waiting to happen ever since Dolly the sheep was born. Yet, when US-based biotechnology firm Advanced Cell Technology (ACT) cloned a human embryo, the breakthrough rekindled the debate on human cloning. This even as the objective of the test was not creating a human being, but mining the embryo for stem cells to evolve therapies for curing diseases.

While the pro-cloning lobby has termed it as a milestone in therapeutic cloning, staunch opposers of stem cell research have voiced their apprehensions that the research is a step closer to human cloning. As a response, the White House has reiterated its 100 per cent opposition to human cloning. However, Norman Fost, director of the bioethics programme at the University of Wisconsin-Madison, believes that a "slippery slope" argument for banning therapeutic cloning is a poor approach.

Going by what ACT says, the firm has only tried to offer a method that would involve combining human eggs and a person's own cells to create embryos. These would provide stem cells, which in turn could serve as a replacement tissue in diseases such as diabetes. The resultant exact genetic match would obviate the need for anti-rejection drugs (see box: *Breaking new ground*).

But as this would require destroying a cloned embryo to extract its stem cells, the medical breakthrough has unleashed a storm over ethical issues. Roman Catholic leaders condemn the



SCIENCE PHOTO LIBRARY

Human cloning: to be or not to be?

loss of innocent human life involved in the research. "Cloning violates the dignity and the identity of human life," says Archbishop Tarcisio Bertone. Raymond Flynn, president of the National Catholic Alliance, doesn't mince his words. "I believe it is a moral breakdown," he says. Australian Senator Brian Harradine feels that urgent action is needed to ban cloning of human embryos for any purpose and to cut off any funding for any scientist or company involved.

In the US, federal money cannot be used for cloning research involving human embryos and so only private

firms can carry out such experiments as ACT did. The Australian parliamentary committee recently recommended that Australia should ban all cloning to produce humans and creating embryos for experimentation but favoured using surplus human embryos from fertility programmes for research. The UK has constituted a regulatory authority with members from both the private sector and government to periodically review and assess breakthroughs in cloning research. The regulatory body bans all reproductive cloning while allowing it for therapeutic purposes.

So, while the advantages of cloning are well recognised, there are many legal, ethical and medical issues that need to be tackled before the technology is given a clean chit. Although ACT's breakthrough is still a long way from making a baby, Italian fertility expert Severino Antinori says that the development would speed up his project of helping 150 million people without sperms to have children. "Now I will clone human embryos for reproductive purposes within four to six months," he says. Patrick Dixon, an authority on the ethics of cloning in Britain, has sounded a warning: human embryos could be legally cloned in one part of the world and then implanted in women in another corner of the globe. Consequently, some US lawmakers have also called for an international code for such research. There is every possibility that private firms would attempt to transplant early embryos into a woman's womb to produce a cloned human being. US Democratic Senator Dick Durbin says, "With this breakthrough, the Senate will step back and say we cannot stop the march of science; where should we draw the public policy and moral lines?" ■

Breaking new ground

How the US-based institute cloned a human embryo in the laboratory

Advanced Cell Technology (ACT) used two different methods to try to create human embryos. The first one was akin to the standard approach used to clone sheep, cattle and monkeys. It involved taking the genetic material out of an unfertilised egg and replacing it with an adult cell. An ACT official says, "We scraped the DNA out of the egg cell and replaced it with DNA from the nucleus of the adult cell." The

researchers started with 19 eggs, adding skin cell genetic material to 11 and cumulus cell genetic material to the rest. Three of the eight eggs with cumulus cells divided once or twice before dying. It was impossible to retrieve stem cells. An embryo would have to grow for about five days and more important, from a ball of cells into a vesicle with two cell types.

The second method used by ACT was to stimulate an egg to divide without being fertilised. Any embryos that might result from this process, known as parthenogenesis, would have only the genes of the egg cell. But they cannot develop into babies.

THE SOUTH

ASIA & THE PACIFIC

CHINA: An emergency fund to pay for forest protection is in the pipeline in China. According to the Chinese government, the first stage will involve a one-billion-yuan package supplied by the



Logging's out in China

Finance Ministry for maintaining 13.3 million hectares of forests in 11 provinces this year.

Logging has been banned in ecosensitive areas in China and the government has spent 20 billion yuan on educating people, replanting and preservation. Zhou Shengxian, the head of the State Forestry Bureau, said that the government's move reflected the realisation of the officials about the ecological role of forests. "This is a turning point for China's forests, an area that has been under-funded for too long," Zhou said.

However, budget planners have indicated that the funding arrangement for forest protection could be temporary. It is argued that China's Forest Law states that forest protection should be paid for by the people who benefit directly from the

trees and that it is not the state's problem.

HONG KONG: Although with the switchover of minibuses from diesel to LPG, the Hong Kong government would be sacrificing up to US \$100 million diesel duty a year, environmentalists say the loss was worth bearing to clean Hong Kong's deteriorating air quality.

It is estimated that the switchover would reduce the amount of breathable pollution particles in the air by 3.6 per cent by 2005 and nitrogen oxide to 1.4 per cent. The estimates are slightly lower than the targets of four per cent and two per cent cuts, respectively, set by Chief Executive Tung Chee-hwa. This is because owners of up to 1,400 minibuses might choose to continue using diesel, reveals Lily Yam Kwan Pui-ying, the Secretary for Environment and Food.

NORTH KOREA: North Koreans are dying at a rate that is more than 40 per cent higher than in 1994 when a series of devastating floods and famines hit the country, said Gro Harlem Brundtland, director general of World Health Organisation.

She revealed that in the North Korean capital, Pyongyang, the annual number of deaths had risen to 9.3 per 100 people from 6.3 per 100 people seven years ago. Brundtland said that women, children and the malnourished were the most susceptible.

The World Food Programme has also estimated that the combination of natural calamities and poor planning have resulted in the deaths of more than two million North Koreans since 1994.

MALAYSIA: Toxic waste dumped in the southern state of Johor has sparked off environmental and health fears. The waste was reportedly brought in from Singapore by illegal dumping syndicates.

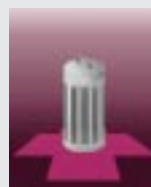
Samples of the waste material have been collected to determine the level of toxicity. Initial investigations suggest that most of the waste was residual paint, paint sludge and chemical sludge left by factories.

LATIN AMERICA & THE CARIBBEAN

BRAZIL: The oil spill near Rio de Janeiro's scenic Guanabara Bay, a few weeks ago, is not as minor as it was reported to be. The magnitude of the spill is coming to the fore only now as environmental officials evaluate the damage from up to 110,000 litres (30,000 gallons) of crude that leaked from a ruptured underwater refinery pipeline. Axel Grael,

SOUTH ASIA

HOSPITAL WASTE: Hospital waste in Nepal's capital, Kathmandu, is posing to be a health hazard for the people. Over 60 health institutions in Kathmandu produce 1,300 kg of hazardous waste every day. This hospital waste also mixes the 350 tonnes of solid waste, thereby aggravating the whole problem. "This unmanaged waste can trigger an epidemic in the capital any day," says Bhushan Tuladhar, an environmentalist and chairperson of Clean Energy Nepal. In December 2000, the Kathmandu Valley Mapping Programme brought out a report that 62 healthcare institutions in the valley were generating 1,312 kg of infectious medical and clinical waste every day.



SAFE SPRAYER: A Rs 2-million project to develop an environment-friendly sprayer to combat insecticides in cotton crops has been launched by the Ministry of Science and Technology (MoST). Under the project, an adjustable height boom sprayer for cotton crop will be manufactured by the Pakistan Science Foundation. The execution, operation and maintenance of the project will be handled by the Department of Structures and Environmental Engineering, Faculty of Agricultural Engineering and Technology.



CALLING FOR MANDATE: Experts were unanimous that gas export would be suicidal for Bangladesh because the country does not have enough reserves to export. Most of them believe that planned use of natural gas by setting up more gas-based industries in the country was necessary. At a national seminar on 'Gas export from Bangladesh', the experts said gas export without people's mandate would be a violation of the constitution.

environment subsecretary of Rio de Janeiro state government, said the owners of the Manginhos refinery near Rio could be fined US \$1.2 million.

The company initially reported a spill of 2,100 gallons (8,000 litres) but later said that the spill was 10,570 gallons (40,000 litres). However, state officials have found that nearly 30,000 gallons (110,000 litres) may have leaked.

ECUADOR: Guayaquil, Ecuador's main port, is set to receive a major clean-up with the Andean Development Corporation (CAF), the multilateral lending branch of the Andean Community, clearing a US \$13 million loan for Ecuador.

To check the pollution of the port's estuary, waste dumps would be constructed and maintained. People will also be educated to decontaminate the area.

At present, tidal waters outside Guayaquil are used to dispose of sewage, even though they are bordered by low cost housing, says CAF. The municipality of Guayaquil has already been given a US \$57 million loan this year for a highway project.

CHILE: Comments made by economy minister Jorge Rodriguez supporting the controversial aluminium plant in an ecosensitive area have created a flutter. And environmentalists are seeking a clarification for the same. They have handed in a written petition to the state comptroller questioning the remarks made by the minister.

Some time back, in a speech Rodriguez had downplayed environmental concerns about the megaproject planned by Canadian metals group Noranda Inc. "Rodriguez has declared his

UNITED NATIONS



In the next 60 minutes, around 600 persons will add to the growing number of people infected by the deadly HIV virus.

Worse, more than 60 children will die due to the infection. This has been stated by a World Health Organisation (WHO) report released recently.

The report revealed that an estimated 3.86 million people were struck by AIDS till the end of 2000. While India accounts for below one per cent of the global AIDS cases, it has more cases than any other country except for South Africa.

The report said that the anti-AIDS campaign in Asia and the Pacific must focus on men, who account for at least 80 per cent of all infections in the region, to help contain the epidemic.

The UN agency has coined the slogan 'I care ... do you? Men make a difference' for the worldwide campaign which stresses on the need for men to care for themselves as well as their partners and children.

In the report, the WHO highlighted the fact that the behaviour of the young men could expose them to contracting HIV as they are more likely to drink alcohol, use drugs or indulge in unsafe sex. HIV is more easily transmitted sexually from men than women, the WHO report pointed out.

support for a project before it has been approved and ratified by a board of ministers which he forms part of. This removes all credibility, transparency and legitimacy of the environmental institutions," says Guido Girardi, who heads a small party in the ruling coalition and supports environmentalists' concerns about the plant which could damage the Aysen region, a zone of unspoiled beauty in southern Chile.

AFRICA

SOUTH AFRICA: South Africa has banned the use of thin plastic bags. And retailers of these bags are a worried lot as they fear that it would wipe out their retail profits.

The South African cabinet recently approved a ban to prohibit anyone from distributing grocery bags thinner than 80 micrometres. The ban would be effective from January 2003.

On the one hand, Pick n' Pay and Shoprite — two of the country's leading retailers — say the ban, if implemented, would seriously hit profits leading to job losses in the packaging industry. The companies believe that the ban would affect the

poorest consumer. On the other hand, Onkgopotse Tabane, head of communications at the Environmental Affairs and Tourism Ministry says that there are other countries who have moved far more ahead of South Africa in using environmental-friendly packaging alternatives.

KENYA: In a move that will see the world's deepest oils drilled off the East African coast, the Kenyan government has signed an exploration treaty with a UK-based company. Although the move is likely to expand Kenya's fuel supply and get the government out of the mess caused by the losses of

the Kenya Power and Lighting Company (KPLC), the drilling could damage the environment of the region. The government is negotiating to have its power system connected to the South African grid.

The British company, Star Petroleum, which has already got the rights to explore for oil in an area located in the Indian Ocean offshore of the Kwale District will now be undertaking exploration 2000-3000 metres beneath the surface.

Kenya is paying attention to oil exploration to reduce the money it spends on importing the fuel. Last year, Kenya's oil import bill was about US \$689 million.

Rigged future: drilling for oil



NIGERIA: The Nigerian government has defended cheap generic AIDS drugs imported from India. Sani Gwarzo, the coordinator of Nigeria's AIDS programme, said, "India is advanced in the manufacture of drugs that we are buying." Nigeria will soon start a trial programme to use cheap, imported generic AIDS medicines.

The import of such drugs has been made possible due to a recent court case in South Africa.

UK / WASTE MANAGEMENT

Recycling gets a boost

TO ENSURE that Britain meets the targets laid by the European Commission (EC), the government has promised to allocate US \$19.91 million for recycling schemes over the next two years.

Environment secretary, Margaret Beckett has said taking the easy route, local councils were putting all waste in the landfill and not bothering about waste minimisation and recycling.

It is estimated that the UK generates

400 million tonnes of waste annually. Many European countries recycle 48 per cent of their waste. In the UK, recycling was supposed to have reached a level of 25 per cent last year, but even today it is only at 12 per cent.

If this trend persists, it would fail to meet the legal limits set by the EC of 25 per cent recycling for composting by 2005, 30 per cent by 2010 and 33 per cent by 2015. Environmentalists and recycling industry feel that the UK's landfill tax should be increased so that composting and recycling are promoted. ■

MEXICO / TOURISM

Protests drowned

DESPITE protests by environmentalists against exploiting the northern Pacific coast for tourism, the Mexican government is going ahead with its plan to develop a beach resort in the northwestern state of Baja California. The greens argue that the project could harm the delicate ecology of the region. Some time ago, the government cancelled plans to build a salt plant in a wildlife sanctuary in Baja California due to massive protests by Mexican and international environmental groups.

The costly resort project would be funded mostly by the private sector and would give jobs to more than 35,000 people. The entire work on the development of the project would be over by 2015. It is expected to draw 700,000 visitors. "It's a natural, protected bay of impressive beauty that is unique and with extraordinary tourism potential," says John McCarthy, head of the Mexican government tourism promotion agency Fonatur.

Apart from three hotels and two restaurants, the complex would have a golf course, a marina, a port, two recreation centres, two condominiums and shopping centres. ■

GERMANY / ECO TAX SYSTEM

Revamp ordered

TO MAKE SURE that industries receiving sops in 'energy use tax' contribute towards environmental protection, the European Commission (EC) — which acts as a competition authority for European Union (EU) countries — has asked Germany to change its eco-tax system. The EC move comes in the wake of Germany's request to the Commission to approve a scheme by which big energy users get an 80 per cent tax exemption over a 10-year period.

However, under the present rules, the scheme was unacceptable to EU. Its rules discourage member countries from giving companies or industry sector concessions in tax that could provide them an unfair edge over their competitors. The EU says that the scheme could be made acceptable if companies in the energy intensive sectors that benefit, such as steel, mining and chemicals, made efforts to improve the environment. "In return for tax exemption, these companies also have to make an effort to protect environmental degradation," says an EU spokesperson. ■

JAPAN / PROTEST

Damned dam

A DAM project proposed in 1966 has again been delayed, thanks to the fishermen in Kumamoto Prefecture. Claiming that the dam would affect their fishing areas, they recently rejected a compensation offer from the Japanese government.

Although the Kuma River Fishermen's Cooperative voted 802-620 in favour of taking the package offered by the government, it fell far short of the two-thirds majority required for approval. Those opposing the dam termed the result as a victory to protect "Japan's most beautiful fresh waterways". Naoto Kan, secretary general of the Democratic Party of Japan, the largest opposition party, said the central government should abandon the project. Earlier too, the construction of the dam was deferred as the government was unable to resolve the compensation issue with the fishermen. ■

CANADA / PINE BEETLE

Wreaking havoc

ACCORDING to recent reports, the mountain pine beetle epidemic in Canada threatens around US \$3.81 billion in lumber in British Columbia's forests. Eight million hectares of lodgepole pine trees are being infested and killed by the beetle, thanks to four years of warm winters in British Columbia, Canada's largest lumber producing province. Researchers say that the infested area is 80 per cent larger than last year.

The epidemic has hit the province's lumber producers at a time when the US has imposed trade sanctions on Canadian softwood lumber shipments. And although lumber producers are chopping down the infested trees, they are aware that to actually stem the spread this winter should produce enough cold weather to kill the insects.

"We can slow it, but we can't arrest it," said Greg Jadrzyk, of the Northern Forest Products Association, which helped fund the study for the province.

As environmental groups may oppose proposals to use clear-cut logging in areas of heavy infestation, loggers are left with no option. They are urging Ottawa for financial aid to fund "an aggressive silviculture" programme in older areas of the infestation, where trees are already dead. This is the only way the affected forest areas can be regenerated. ■

Bugging problem: beetle devastates pine forests



INDIA / COASTAL EROSION

Digha in troubled waters

THE picturesque Digha coast near Kolkata has been dogged by rapid erosion in recent years. Taking serious note of the steady deterioration of the coast, the West Bengal government recently sent an SOS to the Union government requesting it to protect the coast and its population from further environmental degradation.

"The Bay of Bengal is fast eating into

the coastline from Digha to Junpur," says state minister for irrigation Ganesh Mondal, adding, "if action is not taken immediately, Digha will be a thing of the past."

Mondal says as erosion of the coastline is under the Union government's charge, an urgent message has been sent to the Centre urging it to take up protective work immediately.

The state government is also in the process of despatching to the Union government a comprehensive plan to save Digha. ■

B(r)each of nature: Digha's coast faces large-scale erosion threat



ANANDA BANERJEE

INDIA / POLLUTION

Dying lake

IF SUSTAINED restoration plans are not put in place, the beautiful Kodaikanal lake will be dead soon. The artificial lake on a 26-hectare marshy land has been utterly neglected and is fast degrading. The water level of the lake with a perimeter of 4.8 km has receded from 11 metres to eight metres.

The water of the lake has been polluted by sewage and effluents drained into it by hotels and residences located nearby. This has affected its marine life as the oxygen content in the water has plummeted alarmingly. Although the lake was desilted and deweeded in 1996, there is no long-term sustained strategy to depollute the lake.

Manivannan, a biologist, says that apart from the lake water, trees around the lake have been destroyed by atmospheric pollution. Revenue official Pon Muthu reveals that a Rs 15-crore desilting plan and a master plan under the national lake conservation programme are yet to see the light of the day. ■

INDIA / DEFORESTATION

HC frowns at felling

EVEN as the Malana Power Company has paid Rs 63 lakh to the Himachal Forest Department for illegally felling 1,400 trees at the Malana hydro project site in Kullu district, the Himachal Pradesh (HP) High Court has issued notices to the state government and the offending company to file their replies for the alleged offence.

It is reported that although the state government had forwarded Malana's case to the Union ministry of environment and forests (MEF) for approval, the company could not wait for the go-ahead and chopped the trees violating the Forest Conservation Act. The state government slapped a fine of Rs 1.23 crore, out of which Rs 63 lakh was paid by the company.

As the issue snowballs into a controversy, the Chandigarh regional office of MEF has demanded a report from the HP government. It has also sent an independent team to the site for proper assessment of the incident. ■

IN COURT

BLUEPRINT FOR SIKRI: The Supreme Court has given eight weeks' time to the Union government to prepare the necessary plan for making Fatehpur Sikri, the capital of the Mughal empire for some time and now in Uttar Pradesh, a national heritage city for its better preservation.

Acting on a petition seeking rehabilitation of shopkeepers in the vicinity of the historic monument, the court has directed the solicitor general to consult the Union ministers of urban development and culture, Uttar Pradesh government, Wakf boards and the Archaeological Survey of India in drafting the plan for developing Fatehpur Sikri as a heritage city.

CONFISCATION POWER: The Supreme Court recently ruled that forest authorities are entitled to confiscate not only illegally felled timber but also implements and tools used for illegal activities. Allowing the appeal of the West Bengal government against the judgement of the Calcutta High Court, the apex court clarified that the power to confiscate implements was independent of the power to prosecute forest brigands.

GENSETS UNDER CHECK: The Delhi High Court has issued notice to the Delhi Pollution Control Committee (DPCC) on a petition requiring the Central and state governments to define and improve standards of NOx level for generator sets above 19 KVA.

Earlier, the United Communist Party of India, a non-governmental organisation, filed a public interest litigation (PIL) saying that nothing had been done to check the pollution generated by gensets, which were causing harm to public health. The PIL also stated that there were rules framed to contain genset pollution by the Central Pollution Control Board (CPCB) but these needed to be implemented by DPCC and not the state government.

FOLLOW UP

The first commercial product from seabuckthorn, (*Hippophae sp*) has been finally launched in India. The fruit of this plant has high nutritive and medicinal value (A bushful of medicine, *Down To Earth*, Vol 9, No 21, March 31, 2001) and New Delhi-based Compact International Limited has launched Leh Berry, a juice made from it.

Though this is a positive step towards sustainable use of the fruit, the lack of initiative by the department of Indian systems of medicine and homeopathy (ISMH) under the ministry of health and family welfare is disheartening. "We expected a pharmaceutical company to be the first to come forward considering the medicinal potential of the plant," says Virendra Singh, Himachal Pradesh Agricultural University (HPAU), Palampur, which has been promoting the wonder plant.

To ensure that the policy makers are aware of the potential of the plant and promote it, HPAU had organised an international workshop on seabuck thorn in February 2001. During the meeting, it had been decided that a task force would be set up to ensure that the plant is promoted and the department of ISMH was to be actively involved in the process, says Singh. "Nothing has been done in this regard," says SK Sharma, advisor, department of ISMH.

"The area still has the potential to cater for many industries and we hope that more firms enter the field," says Brahma Singh, director, Defence Research and Development Organisation. The Small Farmer's Agri-Business Consortium (SFAC) of the Union ministry of agriculture feels that the industry is a good way of providing employment to the farmers in the area.

"We hope that a private company would now set up an oil extraction unit in the area," says Sudhir Kumar, managing director of SFAC.

INDIA / ORGANIC FARMING

Save the soil

A NATIONAL-level permanent board to monitor the promotion of organic farming in the country has been mooted by a task force on organic farming. According to the recommendations of the task force, the government ought to highlight the sustainability of the concept. Tax incentives for ventures in vermicompost, compost, press mud, etc, compensation for initial loss of produce to the farmers, creation of facilities and adequate certification

agencies, have also been suggested by the task force. It says that the government should carry out demonstrations of organic farming on its farms.

Union agriculture minister Ajit Singh has asked the ministry to take up a pilot project on organic farming. Pointing to the practical difficulties of such farming, Panjab Singh, Indian Council of Agricultural Research chief and a member of the task force, said that the problems can range from availability of compost to quality parameters that need testing labs and checks. These have to be organised and put in place, he said. ■

INDIA / DAM CONTROVERSY

Tehri work on

DESPITE stiff opposition from many corners, three panels each of two diversion tunnels of the controversial 2,400 megawatt Tehri hydel project were closed in the presence of the district magistrate and top officials of the Tehri Hydro Development Corporation

(THDC) on December 1, 2001.

Earlier, the tunnels were to be closed in March 2001. But due to mounting pressure from Vishwa Hindu Parishad (VHP), the Union government was forced to set up a high-powered review committee to look into the matter. The officials of THDC say that the first phase of the Tehri dam, scheduled to be commissioned in March 2002, has now been postponed to March 2003. ■

COMMENT



RUSTAM VANIA

Cancerous pot-belly

A specific condition that occurs in the bodies of inactive and overweight individuals may actually encourage the process of cancer development, claim researchers from the Washington DC-based American Institute for Cancer Research. They say being overweight can cause the body to release high levels of insulin and other hormones known as “growth factors”. In normal people, release of insulin is tightly regulated. But in obese people, the tissues are constantly exposed to high levels of insulin, which cause their cells to reproduce quickly. When cells reproduce rapidly the chances of their random mutation increase. This risk augmentation can lead to cancer (*Hindustan Times*, November 26, 2001).

Injecting a cure

With the help of a chemical, diabetes sufferers with early symptoms could be prevented from developing the disease completely, research has suggested. Trials found that a specific peptide — a substance formed from amino acids — halted the progression of Type1 diabetes (the insulin-dependent form that must be treated with injections) in humans and mice. Jerusalem-based Hadassah-Hebrew University Medical School and Peptor Limited, a pharmaceutical company also based in Israel, conducted the research. It is hoped that the discovery could lead to the development of new life-saving drugs (www.thescotsman.co.uk, November 30, 2001).

Beauty in chemical

A chemical involved in immune system signalling may be able to reverse some types of skin damage caused by sunlight. It could reduce sunburn by activating DNA-repair mechanisms, suggests a new study by researchers from Germany-based University of Munster. This finding raises the possibility that the chemical might be used to prevent or treat skin cancer. The researchers found that IL-12 promotes repair rather than blocking ultraviolet rays, as most sunscreens do (www.nature.com, November 26, 2001).

Choking link

Ultrafine pollution particles can penetrate very deep into the lungs

FOR years, scientists have implicated respiratory problems with pollution particles less than 10 microns in diameter, but to what extent they affect the respiratory system was not known. Now, a study proves that these particulate matters penetrate very deep into the lungs of even healthy children. The study was conducted by researchers of the Leicester Children's Institute for Lung Health, University of Leicester, the UK.

H J Bunn, D Dinsdale, T Smith and J Grigg, the researchers, studied the size and composition of particles within the lungs of people not suffering from any

bronchoalveolar lavage (BL), the fluid consisting of AM, were analysed. The samples of BL were rejected if they had insufficient number of macrophages or if they were infected by bacteria. After this short listing, a total of 22 children between the age of three months to 16 years were selected for the analysis, which basically aimed at studying the percentage of macrophages having pollution particles and the size of these particles. Along with this, data about the area where each child lived was also collected and scrutinised. The children were divided into two groups on the



AMIT SHANKER / CSE

Struggling to find fresh air

respiratory disease. “We wanted to know for certain whether these particles are really able to enter the lung and cells, thereby, causing respiratory diseases,” says Grigg. For this purpose, they scrutinised alveolar macrophages (AM) — lung cells that eat up all foreign particles such as particulate matter present in vehicular emissions. This makes them a reservoir of all inhaled pollutants.

Fifty-one children undergoing surgery but not suffering from any kind of respiratory problems were chosen for the study. “We chose the normal children since they are well defined. We need to know normality before looking at the abnormality,” says Grigg. The samples of the children's

basis of whether they lived in traffic-intensive areas or resided in places that had little vehicular movement.

The researchers found that pollutant particles were present in the samples of macrophages, ranging from one per cent to 16 per cent. Ultrafine particles (<0.1 micron) were predominant and could be seen either singly or in aggregates. These particles were carbonaceous (derivatives of carbon) and were similar in nature to the particles present in the emissions from fossil fuels.

According to the researchers, these findings are evidence enough for the hypothesis that very small pollutant particles penetrate very deep into the airways of children. Researchers believe

that the findings show that if carbonaceous particles are deposited in the respiratory system of normal people, then this must be the case for children suffering from respiratory diseases.

But the study could be prone to some errors, as the scientists were unable to remove the chances that the children had actually inhaled bigger particles, which were subsequently ingested by the macrophages. The absence of metal in the samples was also surprising, as it is an identifying feature of vehicular pollution. The metals could have been leached out of the carbonaceous particles when they were injected in the macrophages or when BL was being prepared for analysis. ■

Executed by convictions

WHO's acceptance of wrong information has resulted in the death of numerous children

SEEING is believing. This idiom seems to be very significant in the light of recent revelations on numerous children dying because of World Health Organisation's (WHO) blind acceptance of wrong information. Researchers from WHO and United Nations Children's Fund (UNICEF) recently analysed vaccination data for the past 20 years and found that children worldwide have been dying because, for decades, WHO has relied

on vaccination coverage data that is intermittently unreliable and sometimes wildly wrong (*newscientist.com*, November 26, 2001).

The researchers found that, at times, vaccination statistics get replicated while records are being made. This results in over-estimation of the occurrence of diseases in some areas. Consequently, while making schedules for the future, more vaccines are allocated for these areas than what is required. As an outcome of this, areas that actually require the vaccines end up getting none. "If your data is over reported, you may not be paying attention to a problem area and kids who normally would have got vaccinated will get a disease and die," said Anthony Burton of the vaccines division of the WHO.

"We discovered that 25 per cent of data was simply missing and 19 per cent was information that had unusual jumps or inconsistencies," added Burton. For example, they found that a large percentage of children in Bangladesh were given the third dose of diphtheria, tetanus and pertussis vaccine in one year. In Sierra Leone, vaccine take-up supposedly jumped from 28 per cent to 68 per cent between 1997 and 1998. The problem is not limited to developing countries, the researchers found. To their utter despair, they even discovered that no data was available from Norway.

"National level immunisation coverage values are a myth," opined virologist T Jacob John, advisor to the Indian

state of Kerala. According to him, year after year India reported vaccinating hundreds of thousands of children against polio, but these figures were much more than the number of doses the country purchased. What is more, independent experts say this has been going on since the 1970s. "Everybody knows about it," says Pierre Claquin, an epidemiologist working in Bangladesh. There, the reported figure for measles immunisation in 1999 was 96 per cent, as compared with 61 per cent from an independent survey. ■

Toxic aftermath

Pollution of the past haunts our present

HEAVY metals can persist in the environment for thousands of years. This astounding fact was proved recently after researchers from the UK-based Nottingham Trent University analysed ancient and current environmental pollution in a place called Wadi Faynan in southern Jordan. They found that pollutants from mines and smelters operating thousands of years ago are, till date, taking their toll on the health of residents of Wadi Faynan (*www.dailynews.yahoo.com*, November 26, 2001). "Even after 2,000 years of dilution by environmental agencies such as wind, the heavy metals remain in high concentrations and continue to exert toxic effects on plants, animals and humans," said F Brian Pyatt, a researcher at the university.

The researchers measured current levels of copper and lead in the arid and semi-arid regions of Wadi Faynan, where Babylonians, Assyrians, Romans and Byzantines carried out large-scale copper mining decades ago. At present nomads inhabit the regions. Ironically, the researchers found that copper and lead concentrations in the regions were exceptionally high even after 2,000 years of wide-open exposure to rain and wind erosion. According to them, the high concentration of metals corresponds to the health problems of the regions, ranging from nausea, diarrhoea and convulsions to coma and death.

Pyatt noted that the link between health problems and ancient industrial history of an area is not unique to the Middle East. "There are many areas of



ARVIND YADAV / CSE

the world where toxic elements mined years ago still persist in the environment,” said J P Grattan, a researcher at Nottingham Trent and a member of the research team. As an example he pointed out an area of southwest England known as the Tamar Valley, where mining conducted between 1880 and 1910 produced heavy metal byproducts that are still present in the environment. According to him, modern industry should learn from the mistakes of the past. It should not adopt techniques that will not only affect the present generation but also the future ones, the researchers opined. ■

The black genie

Gene encoding a mutant form of haemoglobin provides Africans protection from malaria

Africans may be deprived of a lot many things, but some of them are gifted with a gene that provides protection against malaria. A survey done by an international team of researchers recently revealed that every tenth person in Burkina Faso has a gene that provides defence against malaria. The gene encodes a mutant form of haemoglobin called HbC . People with HbC get infected with malaria, but somehow the mutations stop the infection from causing severe symptoms such as anaemia and coma (www.nature.com, November 21, 2001). People with one copy of the gene have 26 per cent less chance to get sick with malaria. And for those who have two copies — one from the father and the other from the mother — the risk gets reduced by an unprecedented 93 per cent!

“The mutation is very protective against severe malaria,” says David Modiano, a parasitologist at the University of Rome, who led the research. “Haemoglobin mutations have arisen under selective pressure from malaria,” says Thomas Wellems of the National Institute of Allergy and Infectious Diseases in Bethesda, Maryland, USA. “It’s nature’s way of telling us which factors protect against the disease.” Researchers have for long known that many other forms of haemoglobin hinder malaria. A good example is a mutation called HbS , which is common throughout Africa. But

unlike HbC , people with two copies of HbS die young from sickle-cell anaemia.

Researchers opine that HbC has protective affects for about 50 years. However, Modiano believes that two copies of the gene are needed for full protection. Wellems disagrees. He thinks the level of protection HbC or HbS provide depends more on a person’s other genes.

However, for now, the finding of the HbC mutation has not much to offer to researchers, as they were unable to crack the mystery of why and how the mutant wins its battle against malaria. They just know that the HbS and HbC mutations occur in exactly the same place in the haemoglobin molecule, suggesting the mechanism could well be universal — a tantalising prospect for developing effective vaccines and other anti-malarial drugs. “If we can nail the protective mechanism, maybe we can come up with that target,” says Wellems.

Moreover, HbC is not found throughout sub-Saharan Africa where malaria is endemic. The reason behind this phenomenon, Modiano speculates, is that unlike HbS , the mutation will take a long time to spread and establish itself throughout Africa because it is rare outside the Mossi ethnic group.

Flourishing unaided

The AIDS epidemic shows no sign of abating with five million new cases reported in 2001

GLOBALLY, there are now 40 million adults and children suffering from AIDS, according to a new report by the World Health Organisation (WHO) and the Joint United Nations Programme on HIV/AIDS called UNAIDS. The epidemic shows no signs of abating — with almost five million new cases reported worldwide in 2001.

The epicentre of the catastrophe remains sub-Saharan Africa, where the disease afflicts more than 28 million people and 2.3 million are estimated to have died there by the end of year 2001. Globally, approximately three million people are expected to die of the disease by 2001.

“AIDS has become the biggest threat to Africa’s development,” the report



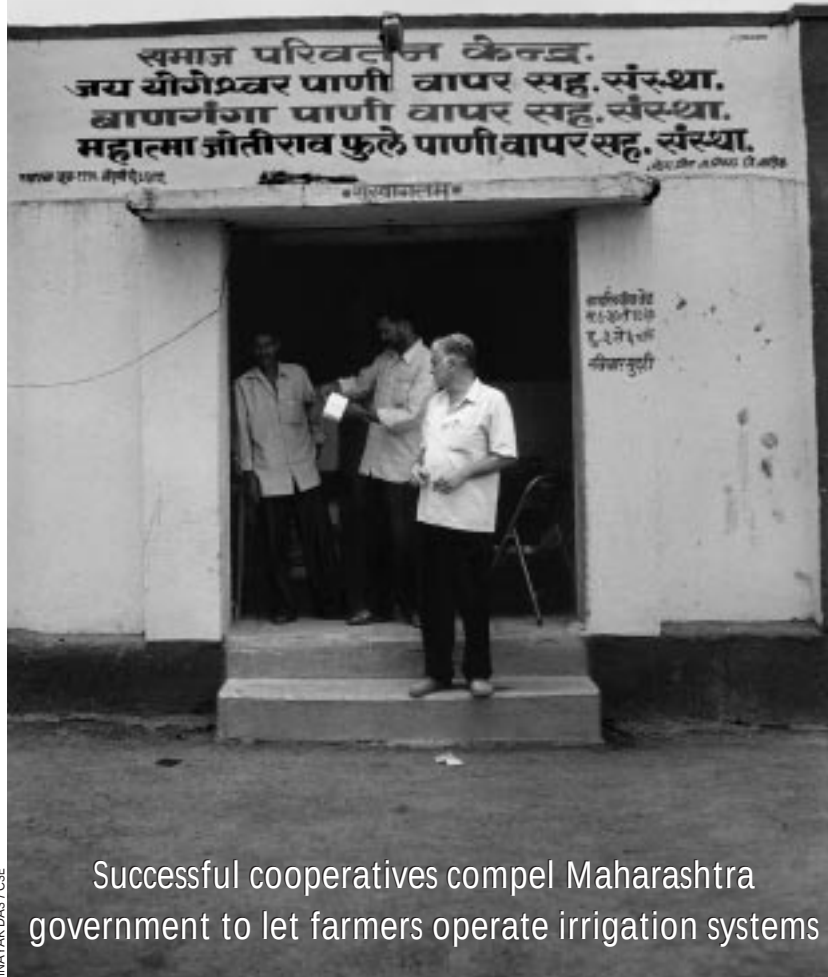
Such awareness is urgently required to contain the unabated spread of AIDS

states. Calculations suggest that the hardest-hit African countries could lose one-fifth of their gross domestic product by 2010 as a result of the AIDS epidemic. The disease has also reduced the average life expectancy in four African countries — Botswana, Malawi, Mozambique and Swaziland. It is now below 40 years — much less compared to ‘the more than 60 years expectancy’ prevalent before the disease took endemic proportions.

The rates of the disease have been also spiralling in other parts of the world, such as Eastern Europe, South and South East Asia. Even in ‘high-income countries’ such as the US and the UK, where expensive anti-retroviral drugs are available, rates of new infections are creeping upwards. “HIV is spreading rapidly throughout the entire Eastern European region. It is unequivocally the most devastating disease we have ever faced and it will get worse before it gets better,” warned Peter Piot, executive director of UNAIDS.

A number of countries are singled out by the report as places where the virus is spreading exceptionally quickly. For example, in China, the total number of AIDS patients may have swelled past one million by late 2001. In the Russian Federation, intravenous drug use is the reason behind the upward trend of the disease that too in just a couple of years — in 1996 there were just a few thousand HIV cases reported, but by end of 2001, the total is expected to be approximately 130,000. ■

Power trickles down



Successful cooperatives compel Maharashtra government to let farmers operate irrigation systems

BINAYAK DAS NASIK

TWO home truths about irrigation departments across India: they are a fountainhead of corruption and run on huge losses.

But July 2002 may prove to be a watershed for rural water supply management. Around that time, the Maharashtra government will hand over control of irrigation facilities to the state's farmers — a first for the country. Experiments conducted by non-governmental organisations (NGOs) over the past decade indicate that on both counts — graft and economic viability — devolution is likely to spawn a turnaround.

The programme has its genesis in cooperative formation in 1989 by NGOs such as the Pune-based Society for Promoting Participative Ecosystem Management (SOPPECOM), the Nasik-

based Samaj Parivartan Kendra (SPK) and the Bhusaval-based Sane Guruji Shram Seva Kendra (SGSSK). But in many ways, it will be back to the future because cooperatives were managing water systems prior to the setting up of government-controlled irrigation departments. To date, about 250 societies covering over 1,00,000 hectares (ha) of land have sprouted in Nasik, Marathwada and Amravati. These local bodies form

water users' associations (WUAs), which manage irrigation systems.

The administration was initially averse to delegating authority, guided as it was by the Chitale Commission report of 1999. The panel observed that farmers were not interested in handling irrigation systems. But armed with case studies of successful WUAs, NGOs have forced the state government to reconsider its opinion. "We are going in for change as experiments showed us that cost recovery was higher when farmers were in charge as compared to the irrigation department," admits S Y Shukla, principal secretary in the department of irrigation. What has tilted the scales in favour of cooperatives are success stories such as the Nasik-Ozhar one (see box: *The Nasik-Ozhar model*). The Ozhar-based Jai Yogeshwar Society and M Phule Water Society retrieved 87 per cent and 95 per cent of the costs, respectively, for the year 2000-2001 whereas government recoveries were a mere 25 per cent in most cases.

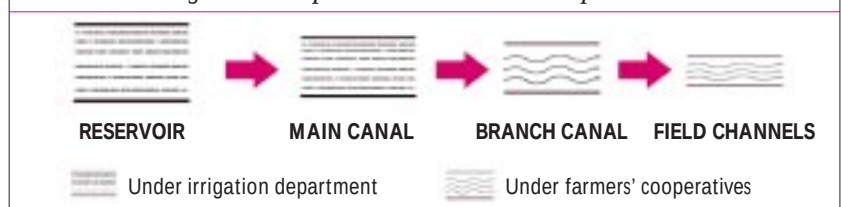
Flow of authority

Under the new arrangement, farmers will be mainly allowed to operate and manage minors comprising supply and field channels that originate from major reservoirs (see flow chart: *The new equation*). Water will be made available to cooperatives on a volumetric basis at a fixed price by the irrigation department. The deal includes freedom to farmers to decide the price at which they purchase water from societies. The administration hopes to save 70 per cent of water and also increase crop area, apart from maximising cost recovery. To form a cooperative, either 51 per cent of the water users have to enlist as members or a minimum area of 400 ha should be under agricultural use.

Though the proposal to transfer power has been approved in principle (see box: *Government notification*), the July 2002 deadline is as yet tentative,

The new equation

How rights and responsibilities will now be split over water



Government notification

Through a notification issued on July 23, 2001, the Maharashtra government has made the participatory irrigation management programme compulsory. Its salient features are as follows:

- The farmers' cooperatives will take up all irrigation work, including dam construction and maintenance

- They will choose their chairperson
- The farmers would take care of the water account
- Water will be distributed to the farmers on a volumetric basis rather than allotment of an area-wise quota
- The notification lifts the restriction on the choice of crops. There will be a sanctioned quota of water for each crop, which may be released on the basis of the crop selected

says Shukla. "The government is looking at logistics and imparting training to farmers to raise awareness levels," he adds. For this purpose, the services of Aurangabad-based Water and Land Management Institute (WALMI) are being utilised. SOPPECOM secretary K L Joy says, "WALMI calls us for lectures, but that is not enough."

Structural snags

The physical status of the irrigation structures will go a long way in shaping the farmers' water management capabilities. As cooperatives lack the wherewithal to carry out repair work, they want the authorities to overhaul the supply systems before handing them over. Rajubhai Kulkarni of SPK and chairperson of the M Phule Water Society avers that the government must shoulder this responsibility. "It is pivotal for the scheme's success," he says. Another impediment faced by the local bodies is the snail's pace at which government work progresses. "Though some WUAs were formed in the nineties, construction and maintenance is still not complete," points out Kulkarni.

According to Shukla, the government will initially help local bodies in decision-making and gradually withdraw from active participation. Farmers would be in charge of future maintenance through a consolidated fund created with contributions. Under the programme, the cooperative and the irrigation department will have a joint fixed deposit bank account. Ninety per cent of the contribution will be made by the irrigation department, while the cooperative would put in 10 per cent of the funds. The interest generated will be used for maintenance and administrative works. The cash-strapped administration is holding informal discussions with the World Bank (WB) for assistance to meet its share of the financial commitment. "This suggests it's a WB-driven project, not a government one," says economist R K Patil, who is also working with SOPPECOM.

The Nasik-Ozhar model

In Nasik, large-scale cooperatives were formed with the support of the irrigation department in 1989. Work began in Ozhar in June 1990 at the behest of the late Babu Upadhyay after the irrigation network was completed in 1983. Upadhyay, a freedom fighter, and Bharat Kavale formed the Samaj Parivarthan Kendra (SPK) that housed three water users' associations (WUAs) — the Jai Yogeshwari Society, M Phule Water Society, and Banganga Pai Society. These bodies draw water from the Wagah Dam's right canal. Currently, 16 WUAs have joined hands to form a federation.

The WUAs have entered into an agreement not to waste water, a target they achieve by following *katkasar* or equal planning and distribution of water. Crop intensity in the region has increased by 136 per cent with a spurt in a variety of cash crops. The area under irrigation has gone up as also water tax recoveries. In addition to this, the cooperatives are earning profits.

Today they stand as examples based on which the Maharashtra government decided to hand over irrigation management to farmers.

Distribution dynamics

Equitable allocation of water is a prerequisite for optimising usage. To ensure this, cooperatives hold a meeting of the beneficiaries where issues such as the quantity and price of water are decided. About 15 to 16 cooperatives under a farmers' association discuss the requirements from a single project. After the proposal is passed it goes to the irrigation department, which releases the required water.

The government is planning to adopt the command area management

development subsidy scheme for the state. As efficiency increases, subsidies and incentives are introduced. "If a cooperative pays the bill on time, it will get a subsidy of 5 per cent," reveals Shukla. Elaborating on the format, Joy says, "Apart from the 5 per cent discount that the government offers, cooperatives have a provision for a 20 per cent reduction in the wholesale rate subject to wise use of water." About 15 per cent of water goes to women's groups and landless labourers who can take tracts on lease. For non-members, the society can charge up to 30 per cent extra to sell water.

Water is given for a period of eight months. Its supply can, however, be staggered over the whole season. It is distributed first to tail-end farmers (those whose fields are located farthest from the feeder source).

The question of water getting diverted during a lean season is a major cause for concern. Bharat Kavale, a pioneer of the Nasik-Ozhar works, takes government officials' assurance on judicious supply of water with a pinch of salt. "During a drought, there is large-scale channelling of water for industrial and drinking water purposes at the cost of irrigation," he laments.

Legal framework

To manage the overall distribution, laws are being framed. The Irrigation Act will be modified within the next couple of months, reveal official sources. Certain rules are already in place. The society is vested with the power to impose and collect fines.

But Patil says that the government has rejected by-laws suggested on the basis of experiments. For now, there is also no proper monitoring of the cooperatives' activities.

Maharashtra is on the threshold of a new era where power is percolating down to the grassroots. If successful, the model could be emulated nationwide. And the faucet turned on to end farmers' water woes. ■



Netting their goal: fishworkers may no longer be in troubled waters

all at SEA

From imposing strict restrictions on harvesting of shark species to having second thoughts about them, the authorities seem utterly confused

KUSHAL P S YADAV

ON JULY 11, 2001, fisherfolk across the country were thrown in at the deep end when the Union ministry of environment and forests (MEF) announced a blanket ban on the catching, processing, stocking and sale of 60 types of sea creatures. These included the entire sub-class of elasmobranchs (sharks, rays and skates), certain varieties of corals and 52 kinds of molluscs.

The MEF's unilateral decision sparked nationwide protests by fishworkers who faced the threat of going under. As the agitation intensified and assumed political overtones, the government was forced to review the regulations. Last heard, a watered down version was in the pipeline.

What prompted the authorities to slap this sweeping ban? And why the haste? S C Sharma, additional director general of forests, MEF, says the drastic step was required to protect sharks and

other endangered marine life. "After the notification was issued, we had consultations with scientific institutions and fisherfolk. We saw no need to do this earlier," reveals Sharma, betraying the authorities' characteristic insouciance.

Bolt from the blue

In May 2001, the whale shark (*Rhincodon typus*) was brought under schedule one of the Wildlife Protection Act (WPA) of 1972. Schedule one comprises the most endangered animals, which are provided maximum protection. Conservationists all over the world hailed this much-publicised move of the MEF to save the commonly slaughtered whale shark (see 'Blood on the beach' *Down To Earth*, Vol 9, No 10). Then, in July, a gazette notification was issued as per which 60 sea animals were put in the schedule one category. Figuring in this list were all the 51 species of sharks found in Indian waters.

Significantly, unlike in May, the powers that be sneaked through this decision. It was such a hush-hush affair

that fishworkers came to know of it only in September-end when the Coast Guard disallowed shark fishing in Cochin, the Customs blocked the export of shark fins in Chennai and a consignment of conch shells (*shankh*) being imported from Sri Lanka was seized in Kolkata. "We became aware of the curbs only after some fisherfolk were arrested," says Vincent Jain, convener, Action Forum Against Ban, a group comprising activists from Tamil Nadu and Kerala.

As the implication of the MEF move sank in, there was a widespread outcry in the shark fishing industry. Among the southern states, Tamil Nadu and Kerala were the worst-hit. While about 50,000 families would be rendered jobless in the former, 6000-7000 households would be affected in the latter. Shark meat is also consumed in the coastal areas. "It is not a delicacy, but a staple in the diet of the poor," says K Gopakumar, deputy director general (fisheries), Indian Council of Agricultural Research (ICAR). "This is a livelihood issue," avers

Sebastian Mathew of the International Collective in Support of Fishworkers, a non-governmental organisation (NGO) based in Chennai.

The whys and the wherefores

What was the provocation for the MEF to adopt such a draconian measure? "A survey was carried out in the Andaman Islands by a joint team of *Sanctuary* (a monthly published from Mumbai) and *Reefwatch* (a Mumbai-based conservation institute)," says Ashish Fernandes of Sanctuary Asia. "We did not find any sharks there and this was communicated to the MEF," he adds. The environment ministry, on its part, claims to know very little about individual shark varieties. "We had to go by The World Conservation Union (IUCN) data and impose a ban as a precautionary step," says Sharma. The MEF has been cagey about the scientific basis for the restrictions. When pressed for details, all that the officials were willing to say was that they had data to validate the decision. But they refused to divulge facts.

It is, however, alleged that the MEF did not consult scientific organisations such as the Central Marine Fisheries Research Institute (CMFRI), Kochi, which specialises in fish studies. "The move is highly unscientific and arbitrary," alleges Mathew. "Fisheries Survey of India and CMFRI have no data about particular shark types," retorts

Sharma. "Information about individual shark species has been handed over to the government," clarifies Mohan Joseph, director, CMFRI. Gopakumar rues the fact that despite ICAR possessing scientific knowledge based on data collected over the past 50 years, the institute's advice was not sought by the MEF.

CMFRI findings show that shark harvesting constitutes less than two per cent of the total fish landings in India. According to its report 'Revalidating the potential of fishery resources in the

Point made: the protest by fisherfolk in Delhi has finally borne fruit



PREETI SINGH / CSE

Indian exclusive economic zone', as against a harvestable potential of 45,064 tonnes of sharks, the average catch has been 35,000 tonnes annually for the past two decades. "If one goes by CMFRI data, there does not seem to be any marked decline in shark numbers," says Mathew.

Severe turbulence

The fishworkers' rage that had simmered over the past month exploded on November 21, 2001 (World Fisheries Day). Activists from all over the nation converged on Delhi and staged an indefinite *dharna* (sit-in) at Jantar Mantar. Earlier, demonstrations had begun in almost all coastal states. Even as fisherfolk blocked highways and harbours in southern India, there were rallies and *dharnas* in West Bengal and Orissa. On November 1, fishworkers' bodies, trade organisations, NGOs and scientists gathered in Nagercoil, Tamil Nadu, at the invitation of National Fishworkers' Forum (NFF) to discuss the ban.

The fisherfolk were shocked at not being consulted by the MEF. "It is ironical that the stakeholders were not consulted," laments Mathew. Jain feels the same. NFF dubbed the move as "arbitrary, unjust, unscientific and a disaster". As the wave of protests gathered force, politicians — never losing an opportunity to score brownie points — took up cudgels for the fishworkers (see box: *In the jaws of politics*). Several members of

In the jaws of politics

When there is a huge vote bank at stake, can politicians be far behind?

Parties across the political spectrum tried to make a killing on the stand-off between fisherfolk and the Union ministry of environment and forests (MEF). Top leaders asked Environment minister T R Baalu to review the controversial notification. Former chief minister of Tamil Nadu (TN) and All-India Anna Dravida Munethra Kazagam (AIADMK) supremo J Jayalalitha made an official statement, demanding that the MEF revoke the ban. The Communist Party of India-Marxist (CPI-M) made a similar appeal. TN chief minister O Paneerselvam wrote to the Prime Minister seeking a review of the move. "It seems that the notification has been issued without serious discussion among different stakeholders — especially the state government and the agriculture ministry — and brushing aside the opinion of experts, he said while addressing the media.

In Parliament, Marumalarchi Dravida Munethra Kazagam (MDMK) leader Vaiko described the ban as

"arbitrary and unjust". He pointed out that the livelihood of fishworkers had been hit in Tamil Nadu, Kerala and Andhra Pradesh. Members of Parliament from the Dravida Munethra Kazagam (DMK), CPI-M and the Congress lent him vociferous support. CPI-M's P Mohan contended that the permission to foreign trawlers to fish in Indian waters was adding to the woes of the fishing community.

Isolated on the issue, the government finally backed off. On December 3, 2001, Baalu made a statement in Parliament informing the House that the ban had been reviewed and the decision taken to include only 10 elasmobranchs in the protected list, instead of all the 51 shark varieties. On the same day, a delegation of fisherfolk and exporters from Tamil Nadu and other southern states was given an assurance that the restrictions would apply to only one species out of those that they were harvesting. Exporters were told that the sting ray, which they dealt in, was also not being included in the ban list.

S C Sharma, additional director general of forests, MEF, says that the hardship faced by fisherfolk has led the government to reconsider its stand. More likely, it is a bait dangled by politicians fishing for votes.

Parliament have raised the issue in the winter session, demanding an immediate withdrawal of the ban. Representations have also been made to Union environment and forests minister T R Baalu.

Rethink and rollback

Bowing to mounting pressure, the Union government has finally decided to review its decision. The proposed new notification includes only nine elasmobranchs, apart from the whale shark, in schedule one. "Since shark fishing is not targeted, we thought of reviewing the ban and keeping only the endangered species in the protected list," reveals Sharma, appearing wiser with hindsight. Among the molluscs, 28 species (including conch shells) are now outside the purview of the regulations. Sea horses and sea cucumbers, however, stay in schedule one.

The MEF seems to have been shaken out of its stupor and is taking a slew of measures as part of a damage-control exercise. It has begun discussions with scientific organisations. "Coastal and marine authorities are being approached for advice, because for implementation of the notification we will have to depend on the Coast Guard

The diluted notification includes only nine elasmobranchs, apart from the whale shark, in the protected list

and Navy," says Sharma. The ministry has also commissioned CMFRI and the Zoological Survey of India to conduct a study on sharks. For all the hectic activity, wildlife laws in India tend to remain on paper only in the absence of an effective monitoring mechanism.

The question of answers

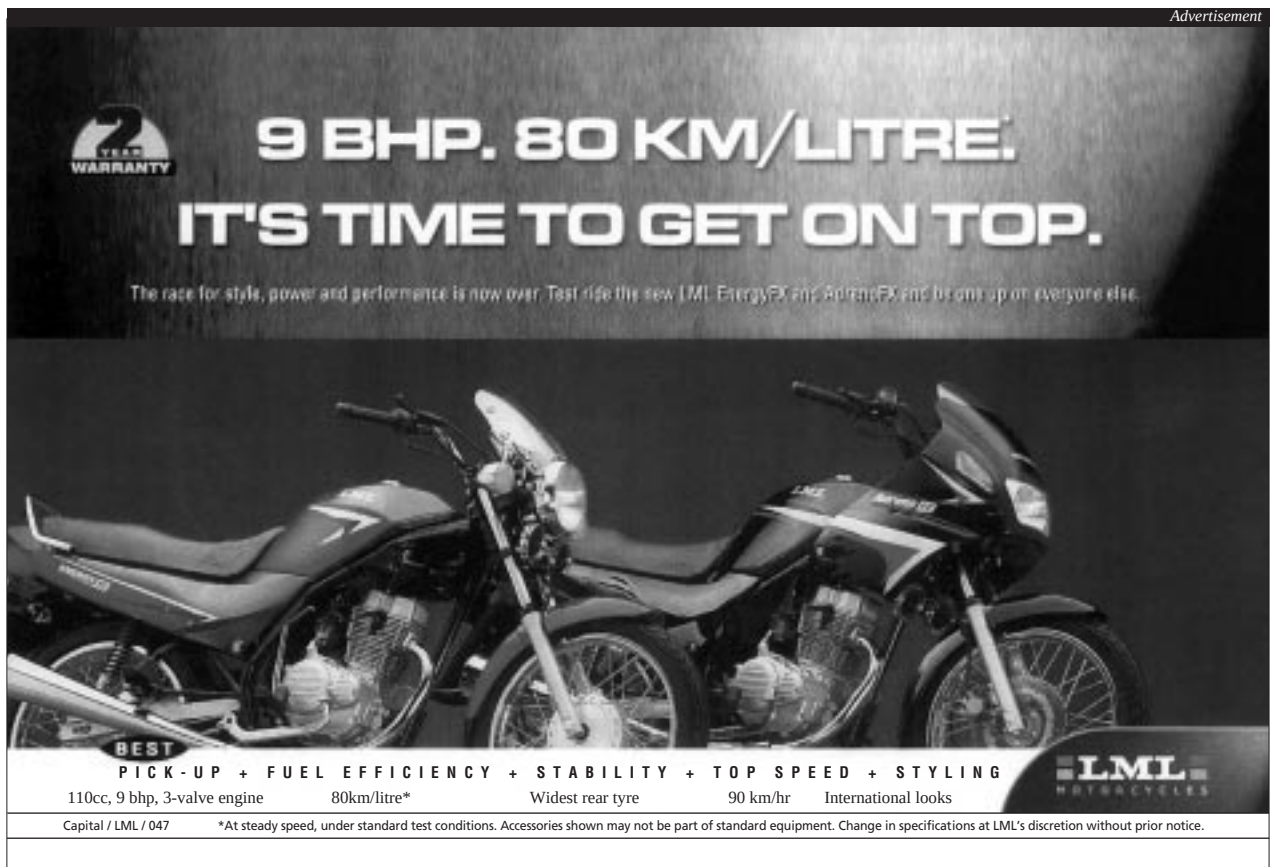
Unity of command, and thus synchronisation, are absent in the management of fisheries in India. While the Union commerce ministry handles the trade aspect of fishing, the MEF is in charge of conservation. Further, the Union ministry of agriculture looks after the development of the sector. "This leads

to a clash of interests and lack of coordination," says Mathew.

The big poser is: how can niggling problems be tidied over?

- Conservation and management are the core issues. A detailed plan and long-term policy must be chalked out
 - Models that are being practised in the North can be studied. Western European nations, Australia and the US have all accorded some sort of legal protection to sharks
 - The UN's Food and Agriculture Organisation (FAO) has a clear-cut management plan for sharks. This, too, can help chart a comprehensive course
 - Restrictions should be based on feedback from technical experts
 - Since shark fishing in India is mainly untargeted (the shark is only caught during fishing for other marine life), methods such as seasonal or rotational ban are more likely to succeed
 - Other solutions include fleet control, which implies curbing the number of fishing boats, and gear regulations such as the size of the net
- With the complete ban being replaced by diluted regulations, the Union government is set to cast its net narrower. ■

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GROWING FENCES

Burgeoning population and agricultural encroachment in the last half century have erected artificial walls within the Gond tribes. These ethnic groups, dominating the Bastar district, have little social or economic interchange today

ZARINE COOPER CHITRAKOT (CHHATTISGARH)

A river tells its story through its geological history and the life that it supports. Much can be revealed to the discerning observer, as in the case of the Indravati river, which traverses the Bastar district of Chhattisgarh. The predominantly tribal population here, whose livelihood depends on this river, is a prime example of changing lifestyles and adaptive behaviour in the face of environmental challenges.

The Kuruk of Chitrakot

Bastar has a large population of Maria and Muria Gonds and other ethnic groups with Kuruk fishermen, who represent a sub-class of the Gonds, occupying all the major fishing spots. One of the most favourable fishing spots here is at Chitrakot, "the abode of the spotted deer." Here, the Indravati forms a magnificent horseshoe waterfall where hundreds of fish swimming upriver are halted and provide a rich year-round harvest. Further downstream, the river flows through a deep gorge. Although the sides of the gorge and the sandbars are thickly vegetated, much of the flora of the Indravati plain has receded in the wake of the steadily advancing wave of agriculture from the east.

April-June is the peak of the fishing season when the water is muddy and the level is comparatively low. The river is rich in 43 species of fish, of which the carp family is the most abundant. Another sought-after species is the *kokia* (*Channa punctatus*), which is prized for its medicinal properties. Early in the morning, one can see the wooden dugout *dongas* of the Kuruk bob up and down on the sun-speckled waves of the great pool as their owners inspect fishing nets or bring in the catch. It is hard to imagine that in the days gone by, prisoners were thrown over the falls to

the hungry crocodiles below. Today, this unfortunate reptile has been hunted almost to the point of extinction.

The main nucleus of the Kuruk community comprises roughly a dozen houses situated within a radius of 500 metres of the waterfall. The pattern of life along the river reveals itself through the words of Mangalram, a Kuruk from

Muchanar village, west of Chitrakot. With typical unselfconsciousness, he informs that his only occupation is the cultivation of rice during the monsoon, while for the rest of the year he does virtually nothing! He goes on to explain that his family lives on the rice that they eat twice a day with either fish or vegetables. The *chapda* pickle that is made out of the large red ants that build their nests in trees also forms part of their diet. Whenever the need for money arises, it is earned by selling fish at the local market. The forest provides them with fuel and edible plants, and hunting still prevails, though wild animals are now



A Kuruk in his donga

PHOTOGRAPHS: ZARINE COOPER

scarce in this area.

Till about 50 years ago, the Kuruk used to barter fish for grain, but later on they had to take up agriculture due to the growing population and smaller catches. Today they grow rice, pulses, millets and a few vegetables. The family shares the harvest and the surplus is sold in the local weekly market. It is common practice here, as elsewhere in the district, to construct a series of embankments across the streams in order to retain water for the paddy fields. During the rainy season, small traps made out of reeds and cane are used to capture the small fish which get stranded in the fields. The villagers build *bisar*, wicker-work platforms supported by large boulders, sloped against the stream so that small fish like the *kotri* (*Barbus stigma*) are unable to pass and are thrown on to the platform.

In the event of a poor harvest, it is amazing to see how readily the villagers can supplement their diet with wild edible plants, fish and small mammals that are still abundant in the gorge. Groups of women and children sing on their way to the gorge from where they collect the *chiur* grass (*Cryptocoryne retrospiralis*) that carpets the sandbars throughout the dry season. During the monsoon, the forest floor is covered with a variety of edible mushrooms. The forest also yields over 100 medicinal plants, of which the local communities have an intimate knowledge and in which they have great faith. Some wild plants have a multipurpose value, like *siali* (*Bauhinia vahli*). While the seeds of this robust climber are eaten, the leaves are ideal for making bowls, and the inner fibre of the stem is used for making rope.

Summer is usually the season for the *parad* or annual ritual hunt, when large groups of villagers, armed with bows and arrows, comb the forest for any animal that might come their way. Formerly, this area was the home of the wild buffalo, tiger, *sambar* and other fauna. With the encroachment of agriculture, much of the game is now confined to the west, south and northwest of the district. However, the Maria around Chitrakot continue to hunt flying squirrels, birds and even field rats.

Changing mobility patterns

The Kuruks do not represent a static society. This is evident in the rapid changes that have been taking place in



A tribal demonstrating the use of pellet bow

this area due to influx of agricultural villagers to their region, new technologies, growth of towns and a marked reduction in the resource base available to them for foraging. Interviews with villagers from Chitrakot and Michanar, reveal that until forty years ago, conditions allowed greater social and economic mobility than that which prevails at present. During summer, small groups of villagers from Michanar and surrounding hamlets undertook fishing expeditions to several places along the Indravati. Increase in population and agricultural invasion forced the need to possess exclusive rights over certain fishing spots. Most people are now confined to the boundaries of their own villages and consequently there is a sharper distinction between members

of various castes as social intercommunication has lost its flexibility.

Today the rights of fishing at the Chitrakot pool belong mostly to the Kuruk residing on the southern side of the waterfall. On the northern bank, the population is sustained by agriculture as well as by fishing throughout the year. The latter, however, no longer constitutes as important a part of the diet as it used to. It is possible that with population pressure and the inability to supplement catches from the river by having ready access to plant foods, the Kuruk sought grain in exchange for fish. The restricted movement and denser population ultimately required the Kuruk and their neighbours to purchase whatever land was still available and to take up farming. Even today their land



Kutul's Hill Maria husking rice with their feet

Even the highest hill is cultivated, regardless of the steep incline and rocky soil, although the summit and base are left undisturbed. Trees, though burnt, are not uprooted, thus allowing some regeneration to take place. February is the month when groups of 12-15 men husk the harvested millets (*kutki*) by stamping on them. Vegetables such as tomatoes, chillies, beans and sweet potato are harvested before the *kutki*. The husking is done on special mats and enclosed by a fence; surprisingly, fields are not separated by fences but by rows of *til* or roselle, or by laying a few logs along the edge of a plot.

Social interchange has lost its flexibility in Bastar today



Dam made of mud and wood across a stream

The sites of abandoned Maria villages can yield interesting information on land use a century ago or even earlier. Kunjang Kustanparre is one such settlement on the spur of a hill, a few kilometres away from Irakbhatty. All that remains of the settlement is a wall of boulders, now in ruins, and enclosing an area of about one acre. Within the enclosure were stone celts (once affixed to wooden handles and used as chopping implements), pieces of pottery and iron slag. Two groups of collapsed stone memorials beyond the enclosure suggest that two clans once lived here, although none of the older men from Irakbhatty could recall when this settlement was occupied. Whereas present-day Maria villages have bamboo wattle-work fences, an ancient one would have required a stronger wall as protection against wild animals or hostile groups.

According to an elderly ironsmith (*lohar*), the only one for miles around, about 30 to 40 year ago, his father used to obtain iron ore from a nearby mountain. These days, of course, metal is procured from Narainpur or any other town. The pieces of slag found at Kunjang Kustanparre confirm that the tradition of mining local ore is a fairly ancient one. Existence of a small dam (*naddi*) across the local stream to provide water for the rice field and large tamarind trees sheltering the village provide interesting lessons in environmental conservation. It soon becomes apparent that despite the odds against them, the Maria have managed to survive due to their age old practices of resource management. ■

holdings generally do not exceed two or 1.21 hectares, some of which have poor drainage and have to be left fallow for a period of four to five years.

Considering the biological affinity of various sections of the Gonds in Bastar and the former existence of a broader scope for cultural interchange as well as freedom of movement, it is possible that these groups have their roots in a population belonging to a cultural unit that was once bound by a stone tool using technology, but which was eventually segmented into various social and economic sub-units.

The dilemma of Abujhmar

All along the north bank of the Indravati river, from Bodhghat to Bhamragarsh, over a distance of 75 km, lie the

Abujhmar hills, home of the Maria Gond. Poverty looms large over this area, so named because of its once impenetrable mountains, now held siege by the Naxalites who have prevented the introduction of tarred roads and electricity. Ironically, these self-proclaimed protectors of the Maria are largely responsible for their downtrodden state. Corrupt government officials have contributed their share of misery, pocketing most of the loans and benefits meant for the poor.

Penda or shifting cultivation is no longer practised in the outer fringes of the *marh*, but is confined to the interior. For example, *penda* is the mainstay of the people (roughly 325) of Kutul, which lies in a small basin of hills, 40 km away from Narainpur in northwest Bastar.

FORESTWAR

Naxalism started as a movement against land alienation. Today it has become a popular movement against natural resource alienation, particularly forests. Large areas of densely forested regions in the country are controlled by Naxalites. In these forested areas, the state and forest administration dare not enter. Naxalites use the growing alienation of tribal people against forest laws to gain ground. They build check dams where governments cannot because of restrictive forest conservation laws. They secure tribal rights over non-timber forest produce and dispense quick justice — at gun point. There are also massive financial gains for the Naxals in looting state forests. Poachers to timber mafia and protection money from paper industry, all contribute to their “revolution”. In short, they run a parallel government in our forests. All this has major ramifications for the country’s forest policy, which has always considered forests as wilderness areas to be managed for conservation or for timber extraction by the state. Instead, what is needed is to see forests as the developmental priority for millions of forest dwellers and to seek their involvement in its protection and management. Sadly, the victims of Naxal violence are invariably the custodians of our forests — forest guards. What is even more unfortunate is that they lose their lives defending laws that are so anti-people. This will have to change if we want to protect our forest wealth. *Down To Earth* reporters travel to these densely forested areas to discover what the Naxal rule means for forest management.





RICHARD MAHAPATRA ANDHRA PRADESH, BINAYAK DAS JHARKHAND
AND PRABHANJAN VERMA CHATTISGARH

AS PRIME minister A B Vajpayee was reminding the nation about threats from across the border in his Independence Day speech from Delhi's Red Fort this year, a group of extreme Leftist outfits, popularly known as Naxalites, were redrawing the internal map of the country. At a secret meeting held in West Bengal's Siliguri, they declared sovereignty over India's forests. The meeting was significant as it brought the two dominant Naxalite groups — Maoist Communist Centre (MCC) and the People's War Group (PWG) — together for the first time to form a death ring in 10 states. A new era of terror was about to be unleashed and India's forests were to become the next battlefield for the war of hegemony.

It is showing up: 827 incidents and 423 deaths in the last nine months. In October, a little known Naxalite group abducted a relative of the Union minister of state for home affairs. Factories owned by the Union minister of state for defence and the Andhra Pradesh (AP) chief minister were blasted by PWG. In Orissa, a minister's house was burnt down. Each day in the first week of December saw police and government officials clash with Naxalites in AP, Jharkhand and Orissa. The renewed attacks have prompted the Union government to ban the PWG and the MCC under the recently-promulgated Prevention of Terrorism Ordinance (POTO).

Genesis of a conflict

Naxalites, the extreme leftist movement tracing their origin to a radical peasant uprising against landlords in West Bengal in

1967, today rule India's best forests. Some 40 groups control a region that stretches from the Indo-Nepal border to coastal AP — an area two-and-half times the size of Bangladesh. And they are spreading faster than forest fires: from a small village to 10 states in just 35 years. Since then, more people have been killed by Naxalites-related violence than in the 10-year-old militancy in Kashmir. Despite the massive police operations, they have continued to spread to new areas. And there is a reason.

By ensuring people's access to forest and distributing forestlands for cultivation, Naxalites have established parallel governments. Willingly or hesitantly, the people too have begun to trust them instead of the government — more for livelihood than for Marx or Mao. The denser the forest, the more is the alienation — tribal people are refused entry into forests; they cannot cultivate lands they believe is theirs. It is simple. People want livelihood, government wants control over forests and Naxalites want 'revolution' against this. "Naxalites have put their weapons at people's service in face of such dilemma," says K Balgopal, a civil rights activist in Hyderabad who recently wrote a book on the movement. On one side is the elected government, which with its misplaced regulations has never addressed people's needs. On the other, is a band of armed people knocking on people's doors to solve their problems instantly — at gun point. Caught between the warring groups, the people prefer the latter. "The parallel government is fast, accessible and gives people access to their livelihood sources," admits a senior police official from Chattisgarh who did not want to be named. For example, courts in the Naxalite-affected areas of Jharkhand have witnessed a drop in the number of cases — from 2,400 in 1996 to 1,600 in 1997.

War of the woods: there are more landmine craters in Naxalite-affected forests than pug marks

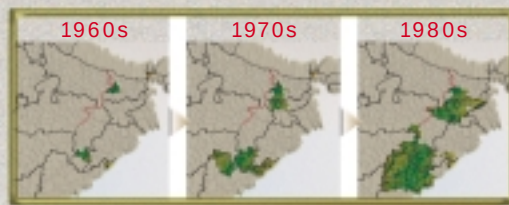


MAHADEO SEN

“The Naxalite movement is spreading because of inequity of

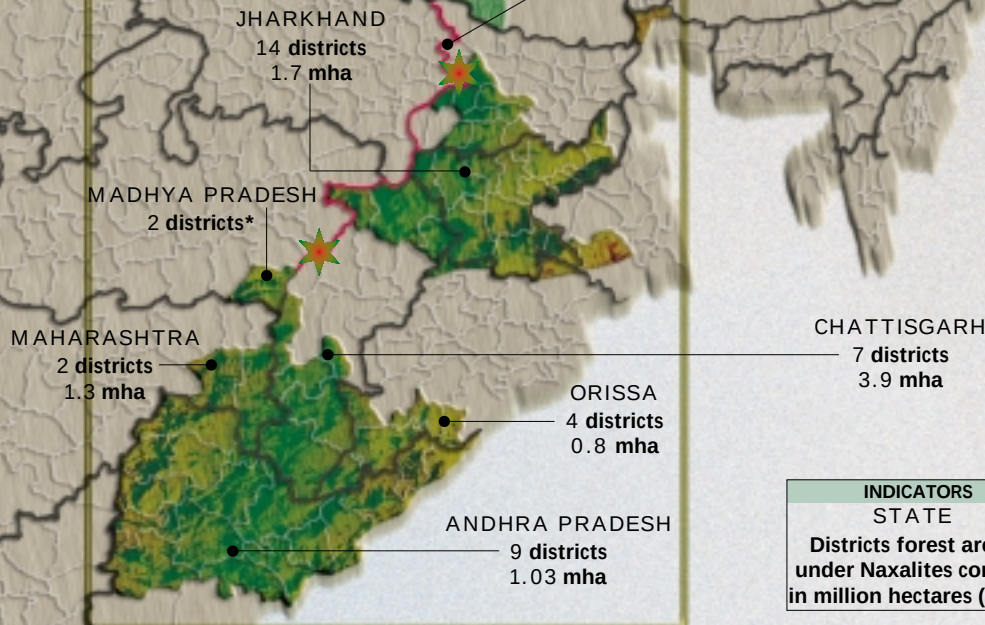
RAPID RED SPREAD

Naxalites control 15 per cent of India's forests and are spreading faster than forest fires



1990s

The proposed 'revolutionary corridor' linking Nepal with India



According to intelligence reports and forest departments' assessments, Naxalite groups have presence in 10 states. But in five states (see map) it has influence over almost all forest areas: 35 districts covering an area of 10.03 million hectares (mha). This estimate is based on *Forest Survey Report, 1999*. This excludes the non-forest areas. This amounts to as much as 15 per cent of India's total forest area 63.73 mha. Going by the geographical areas of these districts, the Naxalites have control over an area in these five states that is more than one and half times the area of Bangladesh. If their control in all the 10 states is considered, it will be an area two and half times that of Bangladesh. Now these groups are working towards opening a 'revolutionary' corridor to Nepal to establish a 'parallel sub-continental' government. This will have major ramifications for the management of our forests.

INDICATORS
STATE
Districts forest areas under Naxalites control in million hectares (mha)

GRAPHIC: SHRI KRISHAN

*Forest areas not included in assessment of intelligence agencies

Wrath of an 'unborn' revolution

In the Naxalite-infested areas, the government ceases to exist. An oral diktat from a Naxalite leader is enough to make government officials shiver. In AP's Telengana region, more than 50 local elected leaders of the ruling Telugu Desam Party (TDP) had to quit the party due to threats from the PWG during the last five years. And those who refuse to listen are killed. Around 2,077 people have been killed in AP by the PWG in the past decade — politicians comprise 30 per cent of the victims. Governments too are at the mercy of the Naxalites.

In Orissa, the government had to withdraw its police force in Malkangiri district when nine police officials were killed by the PWG in August this year. Ironically, over 60 per cent of the state's forces were deployed in this district alone to fight Naxalites. "It was a humiliating defeat," admits a senior state police officer involved anti-Naxal operations for the past 10 years.

In Chattisgarh's Bijapur village, one can't spot a police personnel — they do not wear uniforms out of fear. "The police never come to our village. Naxalites solve our problems," says Sukaru Ram, an 18-year-old boy from Pengunda

village, some 90 km from Bijapur.

Of Jharkhand's 18 districts, 12 are under the control of the MCC and the PWG. On November 2, the MCC gunned down 13 police personnel in Topchanchi block of Dhanbad district. Recent reports in the media suggest that Naxalites are planning to field candidates for the forthcoming *panchayat* elections. Out of 81 assembly constituencies in the state, the Naxalites could decide the winning candidates in 31 of them. The administration fears a 'total takeover' by the MCC.

In Bihar, the MCC and PWG are known to 'tax' even government programmes like Operation Siddharth, Jawahar Rojgar Yojna and Minimum Needs Programme. Government officials siphon off the funds as "protection money". An estimate by the Palamu Commissioner three years ago found MCC and the Party Unity (now merged with the PWG) had collected Rs 30 crore per month as levy.

Caught between the government and the Naxalites, the common people are the worst affected. Both doubt them as informers and this often results in blind deaths. For the police such deaths are the regular fake encounters and for the Naxalites 'execution of the people's enemy'.

resource distribution." — DIPANKAR BHATTACHARYA, general secretary, CPI (ML) Liberation

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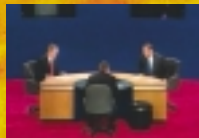
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Kings of forests

The control of Naxalites over forests is total and overwhelming

IN WARANGAL, Andhra Pradesh, there is only one black Ambassador car in the official circle and it belongs to the conservator of forests. Painting the car black some 15 years ago was a conscious decision to evade attacks. The black Ambassador drives home the fear psychosis that has gripped the forest officials. "There is always a risk of an attack," says P Raghuveer, the conservator of forests.

Nearly 10.03 million hectares (mha) of forests in the country are under the control of Naxalites (see map: *Rapid red spread*). Being primarily a tribal dominated areas, the presence of the armed cadres and the police have affected people's lives. Government officials hardly venture into villages inside the forests. The result: little signs of governance. Exploiting this vacuum, poachers are on a rampage and the timber mafia is eating into the forests. Besides, the Naxalites' campaign to grab forestland and clear them for cultivation has become a new problem for state forest departments. Says a deputy inspector-general of forests in the Union ministry of environment and forests (MEF), "The encroachment has become so widespread that we had to shelve a plan to regularise encroachments prior to 1980. If we do so there will be pressures from these groups to regularise all the forests under their control."

According to MEF data, over 0.4 mha of forests in the country are under encroachment — 60 per cent of which are in the Naxalite-affected areas. During a case in the Supreme Court regarding encounter killings of Naxalites, even the AP government admitted that around 0.2 mha of forestlands are controlled by the Naxalites. According to the 1999 *Forest Survey Report*, in almost all the Naxalite-affected districts, forest loss has been attributed to encroachment due to 'local disturbances'.

"The forest department is not needed. We will take care to protect the forests," says Dilip, a young member of the MCC speaking to *Down To Earth*. The forest officials are more than willing. "They tell us not to disturb land use. And we just adhere to that," says a senior forest official in Visakhapatnam district. "Large forest areas remain out of bounds as they virtually control those as liberated zones," says K D R Jayakumar, Visakhapatnam's conservator of forest.

Even the pwg in its report titled *Political and Organisational Overview* prepared after its conclave in February 1995 has admitted that its land grabbing campaigns have contributed to forest loss. "Our nationalised treasury is being emptied," wrote wildlife expert Valmik Thapar in a recent Planning Commission paper. "The MEF informed the Planning Commission that an estimated Rs 50,000 crore is being stolen from India's poorly protected forests. The real fear is not from the Naxalites who have agreed for conservation, but from smugglers and poachers who enter these forest exploiting the Naxals presence."



NILMADHAV PANDA

Forest guardian: a P.W.G. cadre in Palamu, Jharkhand

'Remote' control

The pwg controls the entire Dandakaryanya region comprising Khammam, Nizamabad and Warangal in Andhra Pradesh, Bastar, Dantewada and Rajnandgaon in Chattisgarh, some parts of western Orissa, Gadchiroli and Bhandara of Maharashtra and Balaghat district of Madhya Pradesh. Once believed to be no more than a hideout, the southwest part of Bastar region is now a bastion. Most parts of the Bastar and Sarguja regions are now under the control of the Naxalites.

Even forest areas in Jharkhand, especially in the districts of Palamu, Gumla, Latehar, Chatra, Garwa, Lohardaga, Koderma, Hazaribagh, Giridih, Santhal Pargana and Dhanbad are under the grip of the Naxalites. An Intelligence Bureau report has marked some of these districts as 'obliterated'. This has resulted in the loss of revenue for the forest department. Admits a divisional forest officer, "One cannot deny that there is loss of revenue." "The price bidding in Warangal and Adilabad districts is the lowest in the state as very few contractors come forward because they have to not only pay an additional price to the people and also give money to the Naxalites." This is reflected in the forest department's revenue collection. Out of 90 units of *beedi* leaf collection centres, only 58 could be sold in Warangal district. In Jharkhand's Naxalite-affected districts, revenue from forests has gone down by 60 per cent, according to top forest officials.

In Chattisgarh, more than 40 forest employees have been killed in the last seven years. Vajpayee's first tour to Bastar was called off after pwg blasted a police convoy killing 16 policepersons on October 16, 1998. In the Indravati Tiger Reserve, forest officials hardly enter the deep forest. Says superintendent of the reserve, D N Netam, "We cannot go deep inside the forest." As a result, poachers have killed half of the tigers in the

"Naxal areas are virtually inaccessible."

— RAMCHANDRA SINGH DEO, Finance Minister, Chattisgarh



SAIKAT CHATTERJEE

CHANGING

On March 2, 1967, Bimal Kesan, a tribal peasant of Naxalbari in West Bengal did something unimaginable: he obtained a judicial order to plough his own land. The landlords who were occupying his land attacked him. That was the birth of the Naxalite movement. A lot has changed over the years: the movement started with land alienation issue and subsequently took up forest and other related issues. The traditional bow and arrow has been replaced with AK-47s. Now, the guns are directed against the forest department officials and police, instead of the landlords.

Dipankar Bhattacharya, general secretary of the CPI (ML) (Liberation), the first party of the Naxalites, says that there are two groups emerging from the Naxalites movement: the People's War Group (PWG) which still adopt the old strategy of enemy annihilation. And the second group like the CPI (ML) Liberation that participates in elections. Barring some places, Naxalites are taking up more and more forest-related issues in their campaign. "The movement is a people's movement and issues of natural resources are of prime importance to the people. So the movement can't ignore it," says Bhattacharya.

The predominance of violence in the movement is also working against the groups' people mobilisation efforts. "Continuance of violence will derail the movement," says Bhattacharya. "It is also becoming less participatory as top leaders are losing contact with the cadres," says Kodandaram Reddy, a professor at Nizam College, Hyderabad. In a confidential circular in 1998, the PWG admitted the possible alienation of people from the movement by 'unwarranted violence'. "This alienation may go against the movement," warned Reddy.

LOOKING BACK

As the Naxalite movement faces an ideological dilemma, instances reveal the way it can be contained

reserve in the past six years. For forest officials, there is no estimate as to how many groups of poachers and smugglers are in operation as they are yet to make any serious foray into the forest in the last five years. The last tiger census indicates that while there are some tigers on the southeast bank of the Krishna river, there are virtually none left in the Nallamalla Range. It is said that villagers poisoned tigers at the behest of Naxalites groups.

After a sustained battle in the Supreme Court, the MEF, in 1997, agreed to give separate security forces for counter insurgency operation in six of the 23 project tiger reserves — Manas, Palamu, Valmiki, Nagarjunasagar, Indravati and Bandipur. All these reserves are affected by armed struggles. But the move backfired after some organisations operating in these areas protested against such forces alleging harassment of local people.

"Only 30 per cent of forest reserves in the country are monitored by forest officials," says a forest department official wishing to remain anonymous. The movement of officials has been restricted to such an extent that no official dares to leave the tarred road. "In the 1980s, they could travel without arms for 10-12 km, but now only 3-5 km is possible," he adds. This has had its impact on the people too. On June 15, some MCC activists burnt a few houses in the village of Pahar Panari in the Gumla district in Jharkhand. But the police could not reach there even by June 20, in spite of a police station located within a radius of 10 km. "Even ministers cannot go into the forest," says Ramesh Sharan, an economist with the Ranchi University.

It is alleged that MCC and PWG cadres with support from the *Katha* mafia are threatening the tiger population. The PWG

in north Telengana have killed many tigers between 1990-95 to demonstrate that "wildlife is not as important as people".

Deadly nexus

Slowly, the Naxalites are stepping into the forest department's shoes. There is a growing nexus between them and the timber mafia and traders. The contractors used to earlier bribe the forest department officials for trading in forest produce like timber. Now they pay a levy to the Naxalites. In Jharkhand, police sources say that about Rs 1.20 crore has been deposited by the Naxalites in various banks using fake names. The contractors are happy. Earlier they had to bribe forest officials, police and local criminals. Now they pay only to Naxalites. In AP, a leading paper mill company reportedly pays Rs 50 lakh per month as "protection money" to Naxalite groups.

The presence of Naxalites has also discouraged many NGOs working with tribal people. The Jharkhand government's World Bank-aided India Eco-Development Project (IEDP) to generate employment had to be abandoned. Similarly in AP, two NGOs were driven out (see box: *Looking back*). The Naxalites are against NGOs as they tend to 'eat away funds'. Says sociologist Jaya Roy, says, "They don't want NGOs to organise people."

Although the history of Bastar is punctuated with strong rebellions for land, water and forest rights, the gains have been limited for people. Some experts feel that the support to Naxalites in the rural Bastar may be seen as the extension of the fight for land and forest. "Large tracts are virtually under their control where they run a parallel government," reports a finding of the Delhi-based Institute of Peace and Conflict Studies. The reasons: poor implementation of land reforms, bad governance and ineffective police forces.



RAVI REBBAPRAGADA

PREETI SINGH / CSE

THREATENED

Ravi Rebbapragada's experience in Andhra Pradesh shows how the Naxalites can be tamed. As director of Samata, a Hyderabad-based NGO, Ravi was working in a small village on land and forest issues. He was also mobilising people for their rights in the Fifth Schedule areas. But his activities were monitored by the PWG. NGOs are always viewed with suspicion in the Naxalite-dominated areas, particularly those with foreign funding. "We were told not to work on mobilising people, but to concentrate on health and education," he remembers. When Ravi decided not to leave the village, he got the shocking news: two of his colleagues had been killed by Naxalites.

He shifted to Visakhapatnam to convey the message that he didn't want confrontation. But once again leaflets began appearing in villages issuing threats, particularly around the time when Samata held a huge rally to celebrate its victory in the Supreme Court over land rights. The threats continued. Finally on October 2, 1997, he left the village. "I think the Naxalites got threatened by Samata's popularity on the basis of land and forest issues, two crucial issues for the Naxalites," says a member of an NGO based in Visakhapatnam. Interestingly, a confidential PWG circular issued in 1998 admitted its mistake in asking Samata to leave and supported the Supreme Court's verdict (now known as the Samata case) that gives exclusive rights tribal people over lands in scheduled areas. His colleagues are now back in the village.

UPRISING

Mannapuram, surrounded by forested hills in Srikakulam, is one of the first villages where the Naxalite movement started in Andhra Pradesh. It began as an uprising against the forest department's curbs on the villagers' access to forest and soon spread to several districts.

It is a peaceful village now and no Naxalite group has visited this village in the past five years. "Our fight gave us our legitimate rights over forests. We no longer bribe forest guards for getting wood from the forests," says Biddiki Manglu, a former Naxalite leader who spent a year in jail during the 1967 uprising. In 1994, the youth in the village got together to protect the forests under the joint forest management programme (JFM) of the state government. "It is a major change in the village's history," says Bidiki Adi Narayana, Manglu's son and a member of the JFM committee.



BIDDIKI MANGLU

PREETI SINGH / CSE

Villagers believe that the youth kept the Naxalites away.

However, as JFM enters its eighth year and bamboo cultivation reaches the harvesting season, a conflict is emerging. "The forest department wants more than the agreed revenue from the regenerated forests," says Bidiki Ram Murthy, the vice-president of the JFM committee. The village is tempted to remember the 1967 uprising: "If they don't listen we may go back to them (Naxalites)," warns Murthy.

Law of no returns

As people lose hold over forests, Naxalites gain ground

"NAXALITE vs state is a contest of claims over natural resources," says Jannardan Rao, a professor at Kakatiya University, Warangal. Take the case of the Nallamalai range in AP's east Goodavari district. The 40,000-strong Chenchu tribes, who neither cultivate nor construct houses, are being evicted from the forests as the government has declared the range a national park. So Nallamalai is now the new battleground for Naxalites and the police.

The forest regulations are such that they do not allow developmental work inside forests. This is alienating a large chunk of the tribal population. Naxalites exploit this. In Chattisgarh, people have been demanding renovation of their traditional ponds for the past three decades. "Naxalites construct *talabs* in forest areas where the government can't even attempt due to the Forest Conservation Act (FCA)," says Ramchandra Singh Deo, finance minister, Chattisgarh. Naxalites have seized the initiative to renovate old ponds in several villages in AP and Chattisgarh. Under the FCA, the state government has to secure the permission of the Union government before diverting forestland to non-forest areas. While large projects are passed by the state with MEF, permission for small projects like pond renovation are not taken up. This fuels people's anger. According to a PWG report, in the face of the second consecutive

drought, extensive water tanks renovation in forests was taken up. This strategy has swayed people's support towards them.

Left helpless, the affected states have started demanding amendments to the FCA. About a year ago, Madhya Pradesh chief minister Digvijay Singh wrote to the prime minister requesting changes in the act. When the coordination committee of the Union home ministry met in April 2000, one of the main issues discussed was the amendment. Former Union minister of state for environment and forests and Jharkhand CM Babulal Marandi, supported this. However, the Union home minister has referred the matter to the MEF. Except an informal acknowledgement, nothing has happened.

Inside Chattisgarh's Indravati Tiger Reserve, 56 villages were served an eviction notice when the reserve was proposed as a national park. Protests from villagers didn't make much difference until the Naxalites intervened. "We had to change the map of the tiger reserve to exclude the villages from the reserve," says a forest official. "Naxalites have always used people's movement as a strategic way to mobilise people," says Kodandaram Reddy, a professor of political science in Nizam College, Hyderabad who has written a book on 30 years of Naxalite movement.

Growing chasm

The Naxalite movement has also gained ground due to protests against discrimination over non-timber forest produce (NTFP) and land rights. There are many ways tribal people are exploited: forest officials deny them access to forest areas, non-tribal people take over their lands through a torturous money lending process and traders cheat them while buying NTFP. This has left a large section of forest dwellers without

forests to the people. Peace will follow." — VEMULAPALLI VENKATARAMAIAH, CPI (ML) New Democracy



“Give forests to the people”

Popular singer-poet and former member of the People's War Group, GADDAR, speaks about Naxalites and forests

“The more dense is the forest the more is the exploitation of the tribal people. The forest department (FD) is everything inside the forest; there is no MP, MLA or any other system that can overthrow the FD. The movement entered the Telengana region sailing over dried *tendu* leaves. We entered the tribal villages as *beedi* sellers to convince people about exploitation.

By nature, peace is inherent to human existence. But there is a limit to tolerance. The government listens to people only when there is an audible expression to your protest. Before the struggle, there were several instances of peaceful protests. But government just did not listen. Now when the tolerance level has come to the end, they come out with a solution to police nature. This misplaced strategy will breed more violence. Ask Chandrababu Naidu how much has he spent on production side? We are an agrarian and forest-based economy; you can't spend all your money on technology for export and roads.

While the Chipko movement remains the epicentre of all environmental movements, the Naxalites' armed struggle shows how acute is the problem in the Telengana areas. Armed struggle is one of the struggles that these tribal residents are waging against a system that has not addressed people's problems. Give back the forests to the people and will settle down peacefully in the forests.

Yes, weapons can commit mistakes. I believe that ideology should control the struggle. But the mistakes of few Naxalites are negligible when compared to that of the government.”

PREETI SINGH / CSE

any livelihood sources. “There is a deadly chasm between people and government. The Naxalites are cleverly exploiting this chasm,” says Reddy. “While trade in NTFP is limited, timber remains a government source of revenue. This has led to an imbalance of power at the grassroots.”

Tendu leaf is a major source of income for the tribal residents for six months of the year. But curbs imposed by forest officials have spawned resentment. The Srikakulam uprising in the 1960s, which laid the foundation for the movement in the AP, was based on the rights of the local hill tribes over forests (see box: *Looking back*).

In Maharashtra too, the movement owes its origin to NTFP. Before 1980, the tribal people got as little as Rs 5 for 100 bundles of *tendu* leaf. But threats from Naxalites forced the government to increase the price — it is now Rs 90. This made Naxalites popular: they made their way into Chandrapur and Gadchiroli. Now forest committees set up by Naxalites monitor the forest and its produce in these two districts.

Likewise in AP Orissa and Chattisgarh, *tendu* leaf is used as an instrument for popular mobilisation. Two years ago in Chattisgarh, Naxalites set fire to the forest department's depot containing *tendu* leaf. ‘Trials’ were held and the ‘guilty’ officers were punished in the *Jan Adalats* (people's court). Now, the villagers get 60 paise per *gaddi* (pack of 50 leaves) as against the minimum support price of 45 paise fixed by the government. Villagers believe that the Naxalites ensured this. “Often the presence of Naxalites works as a social audit,” says K Subba Rao, principal chief conservators of forests, AP.

In AP, with the onset of the *tendu* season, a representative of the *tendu* leaf contractors enters the forest for ‘talks’ to bargain for the minimum price for *tendu* leaf. The bargain is always dic-

tated by the Naxalites. It is no wonder that the price of the *tendu* leaf has increased from 7.5 paise for 50 leaves in 1986 to Rs 1 in 2001. Officially in AP it is 54 paise for 50 leaves, but in Naxalite-affected areas contractors give the ‘additional’ 46 paise.

In Orissa's Koraput and Ganjam districts, Naxalites have spread due to stringent NTFP regulations. The case of bamboo is a fine example. Bamboo forests in these districts were leased to the paper mills and local residents became daily wage earners. Even then they end up earning just 50 per cent of the official minimum wage as forest officials collect a heavy booty from the contractors. “Naxalites now not only ensure the minimum wage, but also that it is paid regularly,” says Anadi Sahu, Ganjam's representative in Lok Sabha. The pwc, in turn, collects Rs 5 everyday from the labourers to ensure a minimum wage. “The people earn more money and are spared of the hassles of government machinery,” he says. “Wherever governance fails, Naxalites step in,” says Sahu, also a member of the Union home ministry's parliamentary consultative committee. “In Bihar, the Naxalite movement entered in the wake of the 1967 famine. As governance collapsed, the people had less access to livelihood sources,” says Bela Bhatia who has done a study on the movement for Cambridge University. Agrees Ram Prasad, director, Indian Institute of Forest Management, Bhopal: “The problem is to do with people's alienation from resources.”

A land too far

Taking away tribal land just makes alienation complete and intestate. In all the affected states, land alienation among the tribal population is a major issue. In states like Chattisgarh, Jharkhand and AP, this has caused many rebellions starting from late 19th century to mid-20th century. After Independence also

there has been a consistent effort to take away tribal lands even though the constitution guarantees rights over it. Starting from giving tribal lands for industries in Andhra Pradesh to the recent move to amend the Fifth Schedule provisions. These provisions give total control to the tribal people on their lands. Exploiting this situation, Naxalite groups like PWG recently started a campaign to pressurise the government for adhering to the Fifth Schedule. Eastern Ghats, a hot bed of Naxalites spreading over nine districts of Andhra Pradesh, for example, is no longer a safe haven for nearly 33 tribal communities, including seven primitive tribes, inhabiting these highlands.

Since Independence, tribal people have steadily lost their hold over much of this area. While many have lost their sources of livelihood, others have sought refuge in deep forests. According to the 1991 census, the region's tribal-non-tribal ratio had dropped from 6:1 in 1950 to 2:1 in 2000. Due to various amendments made to the land transfer regulations in the tribal belt by the government, the non-tribal people are holding almost 55 per cent of tribal lands either *benami* or



NIL MADHAV PANDA

Fight over lands: a protest against Ranvir Sena in Bihar

through clandestine means.

In Bihar, upper caste landlords had snatched lands of poor farmers and monopolised common property resources like ponds and fisheries. "The alienation of land was so high that when the Naxalite movement started, there was never a single protest against violent attacks on the landlords," says Bhatia. Even now groups like MCC and PWG distribute lands to the poor and have ensured that dalits get fishing rights in village ponds. This has sustained the popularity of these groups despite massive retaliatory attacks from private armies of the landlords like the Ranvir Sena.

Retaliatory attacks by Naxalites may have stopped landlords for occupying tribal lands, but now governments have taken the initiative. In 1989, the N T Rama Rao government had passed a resolution to denotify 314 villages from the list of areas earmarked for tribal people to legalise the *benami* holding of the non-tribal people. The resolution — the third such attempt since 1965 — was, however, rejected by the then state governor, Kumudben Joshi.

In 1976 too, the then Congress chief minister, P V Narasimha Rao, moved a cabinet resolution to delete 123 villages in Warangal, Karimnagar and Khammam from the list.

When environmentalists and NGOs opposed such attempts, tribal people were harassed by the administration on the grounds that they were hand-in-glove with Naxalites belonging to the PWG. In its earlier stint (1985-89), the NTR Government had burnt down nearly 1,200 Khoya, Khond and Konda-Dora hamlets in the eastern Ghats for their suspected links with the PWG. The operation conducted by the then director general of police, P S Mohan Rao, affected nearly 60,000 tribal families. The displaced, resettled in plains, had to eke a living by working as farm labourers and many women were forced into prostitution to augment earnings.

BYLAWS: AMENDMENTS FOR RESPITE

Is there a way to reverse the trend of the spread of Naxalites? The experience of 46 villages in east Goodavari district and a stronghold of PWG may have an answer. These villages managed to stop the Naxalites from entering their areas. Their weapon: a movement based on minor forest produces co-operatives. In 1998, when the Naxalites blasted the storehouse of the state's Girijan Cooperative Society that buys NTFPs from the village cooperatives in Peddamallapuram village, the women came forward and spearheaded the anti-Naxalite movement. "Women are the worst sufferers of deforestation and all the curbs on access to forests as they collect these NTFP," says Bodeti Lakshmi, a resident of the village.

"Forest rights must be used as a weapon for tackling the problem," says Ravi Rebbapragada of Samata, a Hyderabad-based NGO, who has been a victim of Naxalite threats. History has taught us that Naxalites wouldn't have spread had successive governments learnt from their mistakes: in all the worst affected states, there were massive people's movements for asserting their rights over forest and lands. Governments, instead of addressing the real issue, crushed these movements. As a result, when Naxalites stepped in, they faced little opposition from the people.

Even when governments reacted positively to such an uprising, their commitment never lasted beyond a few years. In the Fourth Plan, area specific development schemes like small farmer's development agency, tribal development projects, forestry schemes were launched for the first time. But in the Ninth Plan, corruption and bureaucracy made such programmes ineffective. Forestry still remains a state monopoly. The Planning Commission in its observation of the Naxalites problem noted: "The forest departments in Naxalites-affected states do not seem to have any coherent policy." It cites the example of Bastar district where 55 per cent area has been declared as a forest. This has led to the spread of Naxalites.

A meeting called by the Union home ministry on April 4, 2000 debated the possible causes of the spread and it was realised that the socio-economic factors were primarily alienating the people from the government and thus there was a need to go for major tribal welfare programmes. Though state governments were given financial assistance for police jobs, no real tribal welfare works have been taken up. Arvind Kumar, chief forest conservator of Jharkhand, warns, "An in-depth study of the forest policy and acts with corrective steps should be undertaken or there is a high risk of the movement spreading further." ■

people, Naxalism will lose momentum." — MADHU SINGH, land and revenue minister and former Naxalite, Jharkhand

FACELESS FIGURES

Table 6: Number Of Incident Cases Of Cancer By Site and Year Of Registration With Percentages
Female, 1991-95

ICD9 Site	91	%	92	%	93	%	94	%	95	%	T	%
140 LIP	5	0.5	2	0.2	2	0.2	3	0.3	2	0.2	14	0.3
141 TONGUE	14	1.4	14	1.5	16	1.7	16	1.6	9	0.9	69	1.4
142 SALIVARY	3	0.3	5	0.5	4	0.4	8	0.8	4	0.4	16	0.3
143 GUM	12	1.2	19	2.0	26	1.7	9	0.9	12	1.2	68	1.4
144 FLOOR OF	0	0.0	0	0.0	2	0.1	2	0.2	0	0.0	5	0.1
145 OTHER MD	34	3.4	23	2.4	23	2.3	25	2.4	21	2.1	125	2.5
146 OROPHARY	1	0.1	2	0.2	5	0.4	7	0.7	5	0.5	19	0.4
147 NASOPHAR	0	0.0	2	0.2	0	0.0	0	0.0	3	0.3	5	0.1
148 HYPOPHAR	11	1.1	5	0.5	10	1.0	14	1.4	8	0.8	48	1.0
149 PHARYNX	3	0.3	2	0.1	0	0.0	6	0.6	1	0.1	11	0.2
150 ESOPHAG	46	4.6	61	6.4	55	5.8	55	5.3	59	6.0	276	5.6
151 STOMACH	32	3.2	29	3.0	20	2.1	25	2.4	25	2.3	129	2.6
152 SMALL IN	1	0.1	1	0.1	0	0.0	0	0.0	2	0.2	4	0.1
153 COLON	16	1.6	27	1.9	18	1.9	26	2.5	22	2.2	99	2.0
154 RECTUM	18	1.8	15	1.6	22	2.3	13	1.3	26	2.5	92	1.9
155 LIVER	12	1.2	17	1.8	11	1.2	5	0.3	9	0.9	58	1.0
156 GALL BLA	11	1.1	13	1.0	10	1.0	9	0.9	12	1.2	52	1.1
157 PANCREAS	6	0.6	9	0.9	11	1.2	10	1.0	12	1.2	48	1.0
158 RETROPER	4	0.4	1	0.1	4	0.4	3	0.3	3	0.3	15	0.3

PHOTOGRAPHS: PREETI SINGH / CSE

Hard facts. Hard to come by. And those that do, seem like fiction. That is the status of cancer data in India — as scary as the killer itself. The killer has cast its shadow over India: over 700,000 new cases and 300,000 people set to die every year, the official estimate.

But deaths don't shake the Indian medical establishment. They send it into a coma — the most recent data on cancer by the Indian Council of Medical Research is 13 years old. When data wears a shroud of silence, the National Cancer Control Programme gropes in the dark. A cancer research and prevention programme cannot

VIBHA VARSHNEY

ROOM number eight is located in a nondescript corner of the All India Institute of Medical Sciences (AIIMS), New Delhi. Gauri Prasad regularly visits this room, which stores medical histories of cancer patients. A resident of Panipat, Haryana, Prasad has been afflicted with lymphoma for the past five years. Now in his third relapse, he wonders why the killer keeps resurfacing even though he has undergone chemotherapy twice. The stacks of files inside the room mean nothing to Prasad's oncologist. "I have treated thousands of patients. Yet I know so little," he says.

The story repeats itself in hundreds of hospitals across India. "There are typical questions a patient invariably asks," says Rajeev Agarwal, a surgical oncologist at Sir Ganga Ram Hospital, New Delhi. Why do I have the disease? How long will I live and how much would I have to spend? A nation with a billion people knows very little about the killer though arguably there are one billion reasons to find out. Desperately.

Yet the medical establishment can't even pin point how many people are killed by cancer. 'One of the top ten killers,' an uncertain government document will inform you. With the cancer registries making cold entries of cancer patients into thick registers, since 1982, Indian medical bureaucracy's understanding of the disease has almost come to an end. Way back in 1975 a National Cancer Control Programme (NCCP) was set up recognising the emergence of the deadly killer. It is frightening to note that 27 years later the programme remains baffled and static as it fails to generate a comprehensive data bank of the disease, which can give vital clues to understand cancer. The National Cancer Registry Programme (NCRP), coordinated by the Indian Council of Medical Research (ICMR), New Delhi, has brought out just seven registry reports though it was established more than two decades ago. The last report was published in 1992 for the year 1988-89. And even these are very rudimentary, revealing just the tip of the iceberg. ICMR plans to publish the next set of data only in January 2002 — after an entire decade.

In a sadistic display of insensitivity, information of cancer registries are never shared, crippling future research. Even sis-

ter agencies find it difficult to access this information. Like cancer, the system remains stubborn.

Data quest

Most doctors say that information collected by NCRP is vital to check the rising incidence of cancer. "We need information to find out the reasons of its occurrence and ways of controlling it," says Vinod Kochupillai, chief of Institute Rotary Cancer Hospital (IRCH) at AIIMS. It helps me find out 'why' I get these patients, says Praful Desai, former director of Tata Memorial Centre (TMC), Mumbai. Providing the best treatment largely depends on information on 'what' works best and in 'which' conditions, says Arun Goel, consultant surgical oncologist, Dharamshila Cancer Hospital and Research Centre, Delhi. "Had curing one patient been our aim, we wouldn't have needed data," he says. "It is believed that breast cancer is on the rise in Delhi, but there is no data to support this fear," he adds. "The data would help to determine the infrastructure needed to cater to the number of patients," says D N Rao, head, department of epidemiology, biostatistics and medical records, TMC.

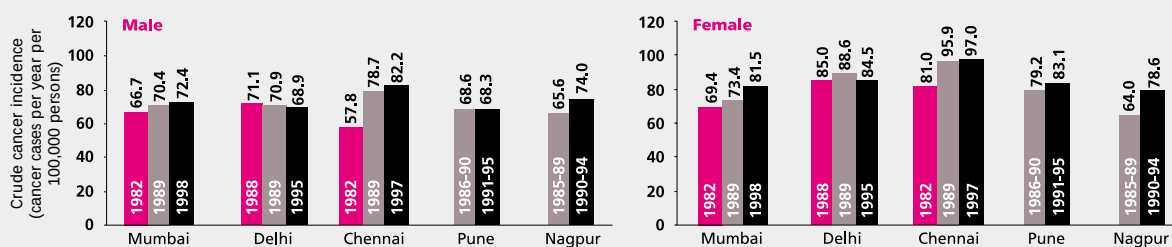
There are estimates by the NCCP though (callosly advertised in the media) saying that some 700,000 new cases are detected each year and 300,000 suffering perish. By 2026, every year more than 1.4 million people will be falling in the grip of this killer, says NCCP. There are a number of reasons for this increase, says P Gangadharan, co-principal investigator, Natural Background Radiation Cancer Registry, Karunagappally. This might range from increase in awareness to a change in lifestyle. Environmental factors are also acting as cancer triggers. A report by the Karolinska Institute in Stockholm found that 60-80 per cent of cancers are due to environment and lifestyle, not genes. Some experts give higher credence to environmental factors. "Rapid changes in the environment and lifestyle control nearly 95 per cent of the cancers," says Cherian Varghese, national professional officer with the World Health Organisation (WHO).

Belated realisation

The government realised the importance of collecting information on the incidence of cancer as early as 1965 when the then director-general of health services, K N Rao's Cancer Assessment Committee, did a cancer assessment and suggested

Gross underestimates!

Down To Earth got hold of data that ICMR refused to share. But these figures are frighteningly improbable. Could Delhi's cancer incidence really be declining?



Source: Indian Council of Medical Research 1992, Biennial report 1988-1989 — An Epidemiological Study, New Delhi, July, p 29. The Indian Cancer Society, Mumbai Cancer Registry 2001, Cancer Mortality in Greater Mumbai 1998, p 44-45. Institute Rotary Cancer Hospital (Delhi Cancer Registry), Biennial report 1994 and 1995, p 56, 58. Cancer Institute (WIA) 2000, Cancer Incidence and Mortality in Chennai — Biennial Report : 1996-1997, p 41-42. The Indian Cancer Society 1993, Cancer Morbidity and Mortality in Poona City 1986-1990, p 53-58. The Indian Cancer Society 1998, Cancer Morbidity and Mortality in Poona City 1991-1995, p 37-38. The Indian Cancer Society 1991, Cancer Morbidity and Mortality in Nagpur City 1985-1989, p 55-58. The Indian Cancer Society 1999, Cancer Morbidity and Mortality in Nagpur City 1990-1994, p 37-38.



the setting up of a National Cancer Registry Programme (NCRP). Along with providing morbidity and mortality figures, the cancer registries were supposed to study the distribution of cancer in different parts of the country. But the government sat on the Rao committee recommendations. In 1972, the then director-general, ICMR, P N Wahi's Cancer Assessment Committee once again recommended a nationwide registry. Finally, in 1982, the NCRP was established — 17 years after it was first recommended.

Two types of registries were started in the country. The Population Based Cancer Registry (PBCR), which would provide information about the trends in the disease in an area and the Hospital-based Cancer Registry (HBCR), which would provide information about the stage at which the patient came to the hospital and the treatment administered. While ICMR funds six PBCRs and five HBCRs, the others are managed privately.

This is how a PBCR supposedly works: it identifies hospitals, private practitioners and pathology labs where cancer cases are diagnosed. Its field workers then gather information

from the patients' records and also meet the patients. PBCR then codes the data according to international standards, analyses it and at the end of the year sends it to ICMR.

The system looks too good to be true. But obviously something is amiss in the system — ICMR's last report was published in 1992 containing 13-year-old data. In between the idea and the reality falls the grim shadow of neglect. The process also has built in loopholes. For example, what happens if a patient of Kolkata comes to Mumbai for treatment and gives his local guardian's address? His record could end up in the Mumbai data and inflate figures. It could also not reflect the status of cancer in Kolkata.

Such errors can be minimised if the methodology in USA is followed. When a cancer patient goes to a doctor, it is the responsibility of the doctor to report the case to the National Program of Cancer Registries, USA. A legislation for the doctor and social security for the patient ensures the methodology is followed religiously. But of course, it happens only in the US.

Talking numbers

Researchers use data to make assessments and suggest preventive strategies

Using data on cancer incidence, Richard Doll and A B Hill of Oxford University School of Medicine, London, way back in 1950 linked lung cancer directly to cigarette smoking. Similar epidemiological studies conducted the world over have found how a diet rich in fats but lacking green vegetables can cause cancer of the stomach, colon, rectum

and pancreas. Some examples:

- In parts of northeastern Minnesota, USA, there were a large number of cases of mesothelioma, a type of lung cancer associated with asbestos exposure. The state is now investigating occupation-related respiratory diseases, finding out whether mineworkers were exposed to asbestos.
- Latest data collected by the Western Australia Cancer Registry indicates that it had overestimated cancer cases for 1996-2001. The control interventions had been successful and

contributed to a fall in the number of actual cases.

- In Kentucky, USA, the cancer registry data revealed that 35 per cent of women suffering from breast cancer came to the hospital only in the late stages, when survival chances are low. By enhancing the detection infrastructure, the registry was able to reduce the cases of late stage breast cancer to 30 per cent within two years. Along with saving lives, the interventions cut treatment costs by US \$4.7 million.

India's Callous Medical Research

Just what does cancer data tell?

IT is impossible to get data on cancer. ICMR and most of its registries seem like impenetrable fortresses of 'knowledge'. The chief of Delhi Cancer Registry believed sharing of information was a waste of time. Exasperated, *Down To Earth's* correspondent travelled to Mumbai and was able to lay her hands on limited data for Maharashtra — some official and the rest generated by non-governmental organisations. A similar journey to Thiruvananthapuram gave a little more data. The dozens of doctors she met, the numerous hospitals and institutions she did the rounds makes one shudder at how helpless an individual trying to ferret out information on cancer in India could be.

But why is data on cancer important? Preventive strategies require a knowledge base of trends in incidence rates. To generate such trends a series of data collected over time and spatial distribution is a basic prerequisite. Unfortunately, the data that the National Cancer Registry Programme (NCRP) provides is too patchy. Arun Goel, consultant surgical oncologist at Dharmshila Cancer Hospital and Research Centre, Delhi helped *Down To Earth* to make sense out of the latest information available.

The most conclusive inference one can draw is that consumption of tobacco is linked to five of the top ten cancers among men in Mumbai, Nagpur, Delhi, Kolkata and Thiruvananthapuram. In Pune and Chennai, six of the top ten are tobacco-related. This is in conformity with the global trends.

A closer look at the tobacco-related cancers reveals another

significant pattern: oesophageal cancer incidence is significantly influenced by factors besides tobacco consumption. This is revealed by the fact that incidence rates of cancers of larynx in men vary by nearly 200 per cent over various cities while the variation in the rate of incidence in case of oesophageal cancer is nearly 400 per cent.

Stomach cancer also shows big difference across the country: it is common in Chennai. Mumbai, Pune and Nagpur are also seen to have higher incidence than Thiruvananthapuram. It is believed that stomach cancer is common in southern India due to its spicy food. But further research needs to be done to identify the causal factors.

The cancers affecting men and women too show a varying trend. In women, cancer of the uterine cervix, which can be easily prevented by awareness, is the most common. Breast cancer too is on the rise. This trend is likely to be seen in other urban areas and, to a lesser extent, afflict the rural population as well.

Cancer of the gall bladder is common in women in the North. It is the third-most common cancer in the Delhi cancer registry. One risk factor for gall bladder cancers is gall stone disease, which too is recorded higher in the northern parts of the country. However, other factors that are likely to contribute to occurrence of gall bladder cancer have not been identified yet.

Sadly the focus of cancer prevention is only on the top cancers, which have remained constant over the years. There has not been much attention paid to cancers that may not be on the top ten, but are steadily rising.

Expanse of the cancer web

Some cancers are common for all cities. New ones are emerging

Mumbai				Chennai				Delhi			
Males		Females		Males		Females		Males		Females	
1998	AAR	1998	AAR	1997	AAR	1997	AAR	1995	AAR	1995	AAR
Lung	10.5	Breast	27.6	Lung	12.5	Cervix	29.6	Lung	11.0	Breast	29.3
Oesophagus	7.9	Cervix	15.8	Lung	10.9	Breast	26.6	Larynx	8.5	Cervix	23.4
Prostrate	6.7	Ovary	7.7	Oesophagus	8.8	Oral cavity	6.7	Prostrate	6.1	Gall bladder	9.4
Larynx	6.6	Oesophagus	4.8	Oral cavity	8.6	Stomach	5.8	Tongue	6.1	Ovary	8.7
Stomach	5.4	Mouth (others)	3.9	Prostrate	6.1	Oesophagus	5.5	Urinary bladder	5.9	Oesophagus	4.4
Mouth (others)	5.4	Uterus	3.8	Oropharynx	5.3	Ovary	4.9	Oesophagus	5.4	Brain	3.2
Lymphomas	5.2	Lymphomas	3.5	Larynx	4.7	Body uterus	3.7	Lymphoma	4.4	Lymphomas	3.1
Hypopharynx	4.9	Stomach	3.5	Lymphoma	4.2	Lymphoma	2.7	Mouth	4.2	Mouth	2.7
Tongue	4.6	Leukemia	3.4	Hypopharynx	4.0	Leukemia	2.7	Brain	4.2	Body uterus	2.7
Leukemia	4.5	Lung	3.3	Leukemia	3.1	Lung	2.5	Gall bladder	3.7	Lung	2.7

Pune				Nagpur				Thiruvananthapuram			
Males		Females		Males		Females		Males		Females	
1991-1995	AAR	1991-1995	AAR	1990-1994	AAR	1990-1994	AAR	1997	AAR	1997	AAR
Oesophagus	8.6	Breast	26.8	Oesophagus	12.9	Cervix	23.3	Oral cavity	17.05	Breast	25.65
Lung	8.2	Cervix	24.4	Larynx	8.5	Breast	21.1	Lung	14.75	Cervix	16.02
Larynx	7.1	Oesophagus	7.5	Lung	7.5	Oesophagus	8.2	Leukemia	7.15	Oral cavity	10.58
Prostrate	6.3	Ovary	6.7	Tongue	5.4	Ovary	7.1	Pharynx	6.69	Thyroid	7.21
Stomach	6.2	Stomach	3.4	Stomach	5.3	Stomach	3.4	Lymphoma HD*	5.65	Ovary	6.54
Buccal mucosa	5.2	Uterus	3.2	Leukemia	4.1	Leukemia	2.4	Oesophagus	5.56	Leukemia	4.98
Tongue	4.3	Buccal mucosa	3.1	Lymphoma	3.5	Brain	2.2	Larynx	5.43	Lymphoma HD*	2.94
Hypopharynx	3.6	Brain	2.7	Prostrate	3.5	Tongue	2.1	Stomach	3.14	Oesophagus	2.08
Urinary bladder	3.4	Lung	2.6	Brain	3.5	Buccal mucosa	2.0	Brain	2.98	Brain	1.96
Liver	3.4	Colon	2.6	Buccal mucosa	3.1	Rectum	1.7	Liver	2.55	Body uterus	1.83

Note: The age adjusted rate or AAR is a measure, which allows communities with different age structures to be compared. In chronic diseases like cancer, AAR are expressed in terms of the number of cases per 100,000 people per year;

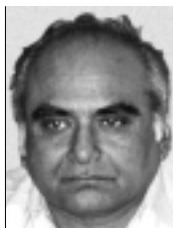
Data for Mumbai, Chennai and Delhi is from 'official' records — registries funded by the Indian Council of Medical Research. The rest is from non-governmental organisations. * Hodgkins lymphoma Source: The Indian Cancer Society (Mumbai Cancer Registry) 2001, Cancer Mortality in Greater Mumbai 1998, Mumbai, p 10. Institute Rotary Cancer Hospital (Delhi Cancer Registry), Biennial report 1994 and 1995, New Delhi, p 62-63. Cancer Institute (WIA) 2000, Cancer Incidence and Mortality in Chennai Biennial Report : 1996-1997, Chennai, p 5-6. The Indian Cancer Society 1998, Cancer Morbidity and Mortality in Poona City 1991-1995, Pune, p18. The Indian Cancer Society 1999, Cancer Morbidity and Mortality in Nagpur City 1990-1994, Nagpur, p18. Regional Cancer Centre, Report of Activities 1999-2000, Thiruvananthapuram, p 68-69.

CLASSIFIED?

The data is rudimentary. The analysis is poor. And is kept secret

“WE ARE not supposed to keep on publishing the report,” says N K Ganguly, director-general, ICMR. “We are supposed to carry out research and cannot spend money on a particular project,” he justifies. It is as if ICMR’s cancer data is protected under the Officials Secrets Act. Repeated requests to gain access to information fall on deaf ears. Regional registries collect information on cancer incidence and publish annual reports. But most of them do not make it public. “Please contact ICMR to get the reports,” says B M Nene, chairperson, Rural Cancer registry, Nargis Dutt Memorial Cancer Hospital, Barsi. “ICMR will give you the information of Delhi registry,” says Kusum Verma, project chief of the Delhi Cancer Registry.

It is not just the lack of published data that rankles but also the tortuous ways of ICMR when it comes to providing information about the NCRP. A questionnaire sent by *Down To Earth* to the director-general of ICMR was supposedly forwarded to the project coordinator who in turn forwarded it to the NCRP headquarters at Bangalore. So far, there has been no reply. “The trends do not change so quickly,” claims Ganguly,



“We are not supposed to keep on publishing the cancer data. We are a research organisation (sic),”

— N K GANGULY, director-general,
Indian Council of Medical Research

suggesting that the earlier data still holds good. But data shows that cancer trends are changing very rapidly. In Nagpur for example, a sudden rise in cases of leukemia and lymphomas in early 1990s can be seen. In Pune, during 1986-1990, cancer of the larynx in men topped the list but within the next four years, it became the third most common cancer in the city.

“Data cannot be published in the form given to us and therefore it takes time to publish it,” says Ganguly, overlooking the fact that the data is given to them in a standardised format. Even the forms for data collection were carefully designed — the methodology was decided in Mumbai in 1980. This was based on the Mumbai cancer registry, which existed even before the NCRP was set up.

While official reasons for the delay are not available, some other reasons (read excuses) for the non-availability are doing the rounds. The data is being “cleaned” by the experts, the data is being reanalysed on the basis of the new population figures of the census. Grapevine has it that the delay is also due to some “internal politics”. “Publishing data is just not a priority with the authorities,” rues Surendra Shastri, head, department of preventive oncology, TMC, Mumbai.

Reliability

The epidemiological studies on cancer in India has a number of shortcomings. One of the biggest shortcoming of the NCRP is the small population it covers. “India is a vast country — people in different areas are exposed to different

types of environmental conditions and have totally different lifestyles,” says G K Rath, head of department of radiation oncology, IRCH. Shastri has an interesting example of how an independent survey can reveal the inadequacies of ICMR’s data collection. “During the preliminary survey on cervix cancer carried out by TMC in the slums of Mumbai, we found that the number of cases reported by the Mumbai Cancer Registry was nearly 20 per cent higher than what we found out,” says Shastri.

Another study which reveals why ICMR needs to go in for far more thorough data collection was conducted by the department of preventive oncology of TMC on cancer incidence in slum areas of Mumbai. The incidence of cancer was found to be shockingly high. In 14 screening camps, 1,207 women were screened for cancer and 22 of them tested positive. There are hundreds of slum areas in the country and the cancer incidence is unimaginable. “Only 5 per cent of the population is covered by the programme,” adds Rath. In the US, the population covered is 95 per cent.

“The data is required only on sample basis for assessing the various parameters in different geographical locations,” refutes C P Thakur, Union minister for health and family welfare (MOHFW). “It is not necessary to have registries for this purpose alone in all the locations while we have other priorities,” he insists. When quizzed why ICMR does not publish data regularly, Thakur says, “ICMR is anyway not supposed to publish the data.”



“Since ICMR data is old, we are forced to depend on other sources.”

— C P THAKUR, Union minister for health
and family welfare

Another weakness is that the data is never analysed as to why the cancers are occurring. Farooq Ahmad Matta, physician at the Jawaharlal Nehru Medical Hospital, Srinagar, cites an example: Data suggests that cancer of the gall bladder is increasing in the northern India. Generally a diet rich in cholesterol is said to be the culprit. Though the diet in Jammu and Kashmir is also rich in fats, there are not too many gall bladder cancers cases. This suggests that factors other than the diet could be responsible for the cancer of the gall bladder.

“The reports are also poorly analysed,” says Shastri. For example, it is said that the incidence of cancer is much higher among the Parsi community. But the fact that the average lifespan of a Parsi is many times higher than others is not taken into consideration. The data may be overestimation or an underestimation.

The research is absent, the data is locked out of sight. Meanwhile, cancer wards across the country are getting noisier. If only the ICMR could listen.



SYSTEM ERROR

The death of India's cancer control programme and the rise of cancers

THE registries would have helped formulate a control programme. But in absence of the data, the NCCP has been forced to source information from other places. "We use World Health Organisation's projections," says Sudhir Gupta, chief medical officer, directorate general of health services at the MOHFW. Ironically, the NCRP was supposed to generate data for the NCCP. Now NCCP is creating its own database to make up for NCRP's incompetence and justify its existence. It recently launched the modified district cancer control programme in four states: Bihar, Uttar Pradesh, West Bengal and Tamil Nadu. The problem is that without data, it is difficult to assess the performance of NCCP.

What started off as an exercise to provide treatment is today thought of as just a trading house for radiotherapy machines. "Maximum focus was on these machines as most of the members of the advisory committee were radiologists," feels Shastri. The programme has emphasised so much on the machines that doctors opine that most members of the medical fraternity remember the NCCP only when funds are needed for equipment.

"Though there are around 280 machines in around 174 hospitals in India, there is a lack of infrastructure to cater to the growing cancer patients," accepts Gupta. The situation is pitiable that between Delhi and Lucknow, only Bareilly has a radiotherapy machine, says Agarwal. Realising its failure to

treat cancer, the focus has now shifted to cancer prevention through awareness.

Too late!

As most patients in India are diagnosed only at the late stages, curing the disease becomes difficult, feel most experts. And this increases the mortality rate. This is largely to do with lack of awareness. According to the Centers for Disease Control and Prevention, USA, surveillance is an effective way of identifying disease-prone areas. For example, in the case of breast cancer, a TMC study showed that if the woman is diagnosed at stage I, the survival rate is around 97.3 per cent. But if the case is diagnosed in stage IV, the survival rate is only 37.6 per cent.

In Barsi, Maharashtra, for example, increased awareness resulted in more cervical cancers being identified in early stages and resulting in increased survival rates — 32.6 per cent in 1987-1988 to 48 per cent in 1991. "Such success stories are rarely heard as government programmes are few. NGOs do their best but the government does not help them," says Piyush Gupta, principal executive officer, Cancer Aid Society, an NGO working towards increasing awareness in different parts of the country. Early detection is possible only if information about trends is available, which would help in identifying the susceptible populations.

It is not easy to identify the reasons for the increase in the number of cancer cases, says Gangadharan. A comprehensive

A couple of projects tried to investigate the effect of environmental factors on the incidence of cancer. But they were abandoned midway



registry programme can give direction to cancer research. Since research is expensive, it becomes imperative that it is focused on specific problems — like finding cheap ways of diagnosis. For example, the department of preventive oncology at TMC is using a solution of vinegar and a hand-held lens to identify cancer of the cervix. This proves much cheaper compared to the conventional pap smear test, says Shastri. Developing cheap indigenous drugs is another priority, feels Goel. The most effective combinations of treatment can also be validated through research. Experts feel that predictive tests, based on cancer data, can be used to assess risk of cancers that are hereditary. In the absence of country specific data, western models are being used to predict the risk. Western data, however, cannot be used in Indian context as cancer behaves differently in two different environments, says Agarwal.

ICMR, which is supposed to monitor the research being carried out in the country, has provided monetary assistance to 284 projects on cancer so far. The majority of projects focus on what happens after the disease has occurred.

Very few projects question why the cancer is occurring. And that too vaguely. To find the cause researchers would have to explore the environment and lifestyle links from food to air pollutants of why the cancers are happening. Focus is on the known risks such as effect of tobacco on incidence of oral

cancer. Only a couple of projects tried to investigate the effect of environmental factors on the incidence of cancer, those too were abandoned midway. One of these projects, was attempting to assess the linkages of cancer with tobacco, adulterants in food and pollution. “ICMR projects are perfunctory and just basic research,” says Agarwal.

Remission or relapse?

“Improvement in cancer treatment and control can be achieved only if the registry data is used extensively by the doctors and the administrators, says Gangadharan. One way of doing this would be to increase the centres where the registries are operating. “All existing 17 RCC should start a cancer registry,” says Varghese. While this would provide information about the urban areas, the RCC should also identify a rural area in their state so that comparative data is available, he suggests. Gangadharan laments that the expected increase in the registry activities has not taken place. Institutions like medical colleges do not recognise the need for data collection. The cancer profile of the country can be appreciated only if variation in lifestyle and socio-cultural background in the country is taken into account, he says.

“It is important that cancer becomes a notifiable disease,” says Desai. A regional seminar on cancer control held way back in 1986 in Chennai had also suggested that data collection would be more effective if the doctors themselves reported the cases that come to them. The Union health minister disagrees. Notifiable diseases are usually contagious ones and it would create unnecessary paperwork if cancer were included in this group, he says. Instead, strengthening the morbidity and mortality data collection system would be sufficient, says Thakur. But the functioning of the present system does not give much hope. A lack of will seems to be the reason behind the inability of the registry to function productively. “Collection of data by the registry should be carried in the same way a business organisation carries out its market research where information collected is used to decide on the strategies,” says Shastri. The country has miserably failed to do so.

“We know that tobacco related cancers are on the rise which indicates that we need to ban tobacco,” says B B Yeole, deputy director, Mumbai cancer registry. But Shastri points out lacunae even in the bans put in place: “While toothpastes containing tobacco have been banned, they are still easily available in the market,” says Shastri. While Thakur assures that smoking would be banned, he expresses his inability to do anything about chewed tobacco. It is just too bad that cancers related to chewed tobacco are more common in the country.

What is needed is a political will to address a problem that has been ignored for long. Comprehensive, up to date epidemiological data. A control programme that identifies susceptible populations and devises strategies to check the spread of the killer. And most importantly, an acceptance of the fact that cancer is a killer and is here to stay. But given the malignant ways of the medicine mandarins, there is little that one can expect of them. Just more cases of Gauri Prasad. And the oft repeated admission: “We don’t know”. ■

With inputs from S Ajith Kumar

बरसों से फाइलों में छिपी नहरें अब पहुँचेंगी खेतों तक

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

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

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



खुशहाल कल के लिये ठोस कदम
मध्यप्रदेश सरकार

Barring the muck

The Tihar jail exemplifies how efficient waste management not only makes our surroundings clean, but also endows us with economic benefits. What is required is a little bit of conviction and hard work



AHIR BHAIKAB BORTHAKUR

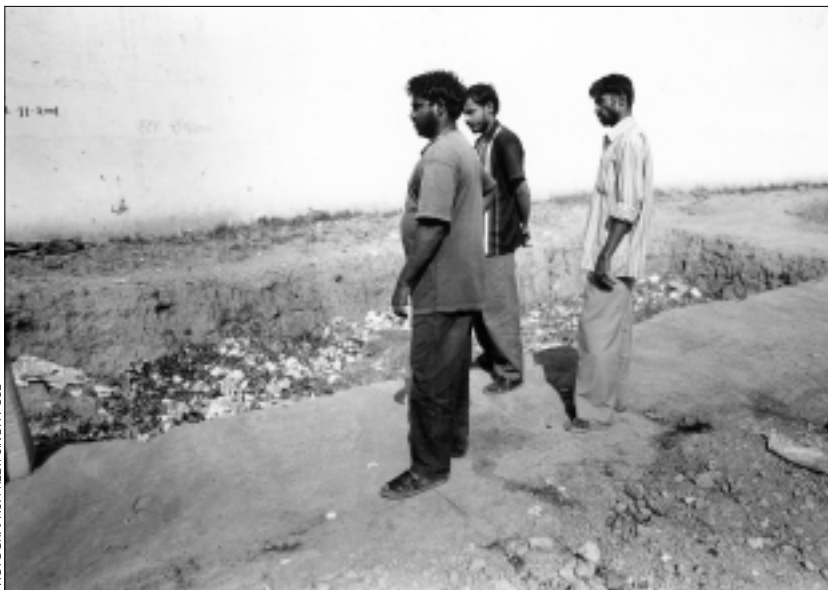
JAIL and inmates. These two words evoke in our mind clichéd images of a 'taboo world' full of grubby and unclean people. Incongruously, it is this 'dirty section' that has turned out to be more concerned about cleanliness and environment — the proof being a commendable waste management programme that is underway in the Central Jail, Tihar, New Delhi.

The Central Jail has six jails. But jail number three stands out from the rest. The inmates of this jail are not only earning a handsome remuneration from an in-house garbage management programme but have also constructed a factory from the rubbish. The programme is unlike any other prison reform schemes. It is entirely carried out by the inmates and its success in a short time period only radiates the high motivation level among the convicts.

Genesis of the change

The programme started in July 2001, with the superintendent of the jail O P Mishra wholeheartedly supporting the innovative plan put forth by V S Yadav, a retired colonel serving a three-month sentence. Soon, the nitty-gritty of the programme was quickly dealt with. A team of 11 under-trial inmates was formed and the area for disposing the biodegradable waste earmarked. The inmates dug five large pits within the prison complex.

Thus, started the daily early morning ritual of the inmates. They collect garbage from jail with the help of a cycle cart. After the collection, the biodegradable waste is segregated from the non-biodegradable ones. Only the organic waste is dumped in the pits. Once the pits are full, they are covered with a thin layer of soil and left for composting. Estimates show that every



PHOTOGRAPHS: PREETI SINGH / CSE

Efforts not wasted: the Tihar inmates overlook pits dug for composting waste

convict generates at least 15 kgs of waste per week. The jail has a total of 3,000 inmates, therefore, 45,000 kgs of garbage is produced in total by the jail.

Till now one pit has been completely filled and covered. "The pit was sealed on August 21, 2001. After a year, its garbage will turn into fine manure," said Vijay Paswan, an inmate, who is a member of the garbage management programme. As the five pits can be reused, the problems faced while finding new landfills have been resolved.

Prior to the starting of the programme, the Municipal Corporation of Delhi (MCD) was managing the garbage in the jail. But the state of affairs was quite despicable. "Previously the garbage remained accumulated in the jail till it was collected by MCD on a biweekly basis and that too depended on the availability of transportation. Due to this, there was a plethora of garbage in the premises. Moreover,

quite a lot of the waste was dropped on the way while being taken to the MCD landfills. But now, with the roaring success of the garbage management programme, such stumbling blocks have been completely eradicated. The jail is not only absolutely clean but numerous associated health problems have been reduced considerably," said Yadav.

Waste or treasure?

The programme is generating Rs 11,000 per month and that too after deducting Rs 300 per head paid to the 11 inmates as remuneration. "This amount can be attributed to the funds saved by not making payments to the MCD," said Mishra. "The income will go up in the near future as we are thinking of marketing the compost which will be generated from the biodegradable waste," he added. Even the non-biodegradable waste like plastic, polythene, glass and metals are sold to local scrap dealers.



The factory built out of scrap material (above); the inmates who are working in the factory and benefitting from the project (right)

Another innovative idea that emerged from the programme is a factory constructed for making furniture and other home fittings. This entire factory, housed in the jail, was built using steel scrap, broken brick pieces and asbestos sheets. The expenditure of construction was a meagre Rs 25,000. Anand Sharma, a prisoner serving a seven-year term, says: "About 20 of us would work in the factory. This project has two positive points. Firstly, we will learn skills that would help us a lot while searching for employment after being released from the jail. Secondly, we can earn money."

The factory, which was inaugurated on November 15, 2001, has already started doing business. Its first client is Siva Niketan School, New Delhi. It will provide doorframes, windows, doors and wooden furniture to a new building of the school. The jail will also provide potted plants, ornamental trees, as well as paintings and murals to the school. "I am delighted to see the skills and enthusiasm among the inmates. I am very happy that our school will be constructed with the waste material from the jail," said Ranjana Kaul, chairperson of trustees of the school who is also an eminent Supreme Court lawyer.

The role model

Other jails of Tihar are now being inspired by the overwhelming accomplishment of the programme. The next



in line is jail number four, where a similar programme would be started by January 2002. The programme is not only economically viable but also helpful from security point of view, as now there are very little chances of the inmates escaping from the prison using the MCD trucks. Several attempts of jail-break have been made in the past in this manner.

Moreover, the programme is contributing constantly to the Prisoner's Welfare Fund (PWF). "The fund plays a significant role for supporting the needy family of the inmates," said Mishra. "Such incentives and the convicts' commitment are the main factors responsible for the success of the programme," he proudly states.

Certainly, the Tihar inmates are going green. The garbage management programme is not the only proof of this. According to Mishra, as Tihar has a huge area of 161 hectares, plans are afoot to start a tree plantation scheme and use the manure produced by the garbage management programme for this. Undoubtedly, such plans would make Tihar an example to be followed by many others. ■

The green warrior... ...endeavours to clean the environment

V S Yadav, a retired colonel, just strives for one thing: cleanliness. Around two years ago he had declared a war on garbage by starting an organisation called the Hawk Eye Environmental Service that runs a waste management programme. "It was quite frustrating to see piles of garbage lying all around. But neither the government nor the residents seem to care. Therefore, I decided to start my programme," recalls Yadav.

His commitment is such that he even took his mission to the Tihar jail, where he spent three months a year ago, when implicated in an alleged murder case. During his stay, he reformed the way garbage was managed in one of the jails. By encouraging a handful of inmates, he started an in-house garbage management programme that proved to be both economically viable as well as ecofriendly. "At the very onset, I knew the programme would work. The inmates got motivated when told about the economic benefits," said O P Mishra, superintendent of the jail.

Yadav's organisation based in Shankar Vihar locality of Delhi Cantonment area runs on a no profit no loss basis, catering to almost 1,000 households of the locality. "Previously, when Municipal Corporation of Delhi was collecting the garbage from our area, the situation was pathetic. But now, Yadav's programme has made our area absolutely clean," said Sudhir Yadav, a resident of Shankar Vihar. Cleaning up Shankar Vihar proved to be helpful in other ways also: the locality is near the Indira Gandhi International Airport and the litter attracted birds that disturbed air traffic.

"I want to start similar kind of a programme for other localities. Many parts of Delhi stink. People need leadership and the government can provide them with the right kind of initiatives," opines Yadav.

Coochie-cooing for oilspills

After a 1995 oil tanker spill at the mouth of Tasmania's Tamar river poisoned a colony of little penguins, the Tasmanian Conservation Trust swore the birds would never again be defenceless. It has now unveiled their unconventional armoury: a stockpile of stylish sweaters, knitted by volunteers worldwide. In an emergency, rescue workers plan to clothe contaminated birds in the woolly jumpers to prevent them from ingesting the oil. Rescue penguins often die from oil poisoning before workers can decontaminate them. Once the penguins are cleaned and released, the sweaters will be discarded (*Discover*, Vol 22, No 11, November 2001).

Predicting the intensity

The question of when and how hard the next El Niño or La Niña will hit can now be answered up to nine months ahead of the event. This would be possible because of pioneering work done by the climate scientists of Commonwealth Scientific and Industrial Research Organisation (CSIRO). "We use sophisticated climate models run on a supercomputer to predict sea surface temperatures in the equatorial Pacific Ocean. These temperatures provide a measure of the strength of El Niño and La Niña," says Ian Smith of CSIRO (www.unisci.com, November 30, 2001).

Destructive logging

Logging makes rainforest regions susceptible to destruction, proves a study. Researchers from the Ludwig-Maximilians-University, Germany, studied the recently-logged regions on the south-east Asian island of Borneo. According to them, rainforests are normally wet and fire-proof. But deforested areas burnt more frequently and severely than virgin forests. When selective logging takes place, flammable wood is left on the ground. This, and road construction, punch large holes in the forest's canopy which let in the sun and dry out the scrub beneath. Ground fires then "become more destructive," says Seigert (www.nature.com, November 26, 2001).

Melting to extinction

Biodiversity in the UK threatened due to climate changes



The mountain ringlet butterfly: future victim of global warming

CURRENT forecasts of climate change for 2050 suggest a significant adverse effect on flora and fauna species and habitats in the UK. This was the finding of an extensive study that used computer modelling and observation for assessing impacts of climate change on 50 species of the country. The study was conducted by the UK Climate Impacts Programme with the help of several English, Welsh, Scottish and Northern Irish environment agencies and non-governmental organisations like the Royal Society for the Protection of Birds. "It is clear that changes are occurring and at a rate beyond the capacity of many natural systems to respond without human assistance," note the researchers in their report, *Climate Change and UK Nature Conservation: A Review of the Impact of Climate Change on UK Species and Habitat Conservation Policy*.

The mountain ringlet butterfly, which at present inhabits the Lake district of the mountainous area of Scotland, will become extinct irrespective of any efforts to conserve the species. The study attributes this to the loss of suitable habitat as a result of climate change. Another species that will be most adversely affected is the capercaillie, a bird. At least 99 per cent of its Scottish highland habitat is expected to degrade by 2050. As warming leads to drying up of soils in summers, the beech

trees are expected to disappear from the south of England and East Anglia. The same fate awaits the snow bunting, a bird that prefers colder climes. The study predicts that some species like the beech and natterjack toad will move northwards to colonise new areas.

Higher temperatures and increased dryness in the eastern and southern regions are not the only cause of trouble. More wet winters and increased extreme weather events like floods and droughts will also alter habitats. According to the study, southern summers will be 22 per cent more dry by 2050 while sea levels in south and east will rise by about 78 centimetres. Rising sea levels will cause widespread flooding of coastal habitats with curlews, dunlins and redshanks losing food resources. But the oyster catcher will gain from flooding. The habitats most sensitive to climate change impacts are montane habitats and raised bogs, which are vulnerable to loss of suitable climatic conditions.

To preserve wildlife, the study suggested schemes that could be used to provide buffer zones around protected areas or to assist species and habitats in moving to new sites by creating stepping-stones for them. However, such schemes have a limited function as they can protect birds and insects but are not of much use to most of the plants that are too slow to adapt to changes. ■

The unholy accrual

Pesticides pollution threatens the aquatic life of the Ganges, especially the Gangetic dolphins

SAMIR KUMAR SINHA AND
RAVINDRA KUMAR SINHA

“SAUNS sabhi ko pyari hai, Ganga maiya ki sawari hai.” This is the constant chanting that follows every splash of water as fisherfolk in Patna nudge their boats along the banks of the Ganges. And the hymn simply denotes a truth: Gangetic dolphin is dear to all and it is the vehicle of the mother Ganga. Ironically, these fisherfolk are oblivious to the fact that the Gangetic dolphin — locally known as *sauns* — is a victim of high levels of pesticides, which is one of the possible reasons behind their high mortality rate in the country.

Surface run-off and city sewage containing high levels of pesticide residues are posing severe hazards for the aquatic life of the holy river. The pesticides can be found at every level of the river's foodchain. The Gangetic dolphin (*platanista gangetica*), a species declared endangered by the World Conservation Union (IUCN), is particularly vulnerable to the threats from these pesticides. The dolphin indirectly consumes the pesticides while eating fish, molluscs and insect larvae, especially that of gomphus. The animal, being at the top of the foodchain and having a thick layer of sub-cutaneous adipose tissue, accumulates maximum persistent organic contaminants that are highly soluble in lipids. This accumulation is a result of successive bio-magnification at different levels. The lipid soluble organic pesticides primarily accumulate in the dolphin's blubber, an extensive fat layer just below the skin. Mammals have some capacity to de-activate and remove a limited amount of toxic substances from their bodies. However, despite being mammals, most of the dolphins are poorly equipped to encounter this mechanism as they lack most of the essential enzymes required for it.

While investigating the pesticide residues in the tissues of dolphins from different locations in Bihar, investigators

found a maximum of 64,000 parts per billion (ppb) of dichlorodiphenyl-trichloroethane (DDT) residue in the blubber of a calf dolphin. The concentration of polychlorinated biphenyls (PCB) in the blubber of the same calf was 13,000 ppb. A maximum presence of 1,900 ppb of hexachlorocyclohexane (HCH) was reported in the blubbers of dolphins found in Patna. The levels of PCBs, DDT and HCH in the milk collected from the intestine of a dead calf were found to be 620, 4,800 and 400 ppb respectively. The dolphins, whales and porpoises lactate high fat content milk that helps in rapid growth of their calves. Such high fat containing milk provides an ideal medium to lipophilic organic pesticides to get accumulated. This strongly affects

the physiological growth of the young.

Anupma Kumari from the Environmental Biology Laboratory of Patna University conducted another study, the results of which are mind-boggling. She found that 13.6–1,665.9 ppb DDT was present in the Ganges fish. Even the levels of HCH and endosulfan pesticide were found to be very high. Moreover, this phenomenon not only affected the humans who consumed these fish but the fish eating bird population even seemed to be at high risk. Due to pesticide toxicity and consequent decrease in calcium adenosine triphosphate, their eggshells have thinned considerably. This is adversely affecting their reproduction.

Environmental biology laboratory of Patna University, Bihar, department of environment conservation of Ehime University, Japan, and the Institute for Environmental Technology of the Michigan University, USA, had in 1998 also conducted a study about the pesticide pollution. Their study revealed the presence of PCBs and organochlorine pesticide residues in high concentration in the sediment and fish of the Ganges.

These are not the only studies conducted about the pesticide menace faced by the river, which is a symbol of India's cultural heritage. There are many more. However, they fail to evoke a response from the authorities and the failure of Ganga Action Plan is a proof of this. According to experts, if the pesticide pollution is not contained, the Ganges may soon be bereft of all its aquatic life. ■

Charting the menace

Biological magnification factors* of pesticides in biota of the Ganga¹

	DDT	HCH	Endosulfan
Small fish	2.6×10^5	2.5×10^5	5.4×10^4
Large fish	1.2×10^6	4.8×10^5	7.6×10^4
Dolphin muscle	5.8×10^6	5.5×10^5	1.5×10^5
Dolphin blubber	3.0×10^7	6.5×10^5	1.9×10^5

*Ratio between the concentration of pesticides in biota and the concentration in water

¹In the stretch of Bihar

Source: Ph D thesis, Anupma Kumari, environmental Biology Laboratory, Patna University — Biomonitoring of river Ganga with special reference to bioaccumulation and biomagnification of hazardous chemicals in fauna of the Ganga.

Sewage being discharged in the Ganges (left) mourning the death a dolphin (right)



PHOTOGRAPHS: DR GOPAL SHARMA / PATNA UNIVERSITY

Sun lighting up the valley



Solar lighting systems have brightened up the gloomy winters of Himachal Pradesh's Mayad valley



BHASKAR GOSWAMI / CAPART

An onlooker admiring a solar home lighting system in Mayad valley

LIAN CHAWII, LAHAUL SPITI

COME winter and the inhabitants of Lahaul Spiti district of Himachal Pradesh face bleak days ahead. Heavy snow brings life to a grinding halt. But an exception is the Mayad valley, where solar home lighting systems have brought more than a glimmer of cheer on the faces of its inhabitants.

In 1998, Barefoot Solar Engineers (BSES) from the Social Work and Research Centre (SWRC), an non-governmental organisation based in Tilonia, Rajasthan, installed 100 solar home lighting systems in the valley. The Council for People's Action in the Advancement of Rural Technology (CAPART), an autonomous body, funded the project costing Rs 23.5 lakhs.

Mayad valley comprises 10 villages out of which four are inaccessible by road and have no connection to the grid. Even the remaining six electrified villages receive erratic power supply during summer and the lines are completely cut off during winter when the snow piles up more than two metres high. So the people have to gear up for seven months of hardship by collecting kerosene, fuelwood and fodder during the warmer days.

It is because of such difficult survival pattern of the local people that the region was chosen for solar electrification. But the same problems deterred two BSES, who came to conduct a survey of the region. Seeing the harsh conditions they returned to Tilonia in vain. "After seeing the living condition of the people in the region, I gave up hope on my first trip," says Mohan Singh Bisht, one of the two BSES. But this did not perturb them for long: they took up the challenge and soon returned to the valley. After successive interactions with the local *panchayat* (village council) leaders, the BSES gradually started giving the project a shape.

However, the worst was yet to come. Since the valley is inaccessible by road, vehicles can only reach up to Shakoli village. Moreover, the route is interrupted by numerous rivulets, which become highly turbulent during monsoons and freeze during winter. But this did not deter the confidence of 149 members of the local community (including women and children), who volunteered to carry the materials consisting of 1,090 solar home lighting systems and other equipments, till Tingarat village, which is approximately 14 kms from Shakoli. The task was

completed in two days. Regular and good quality power supply brought positive changes in the lifestyle. "The women are now able to knit till late at night and winters are not as bleak as before," says Chi Chiangmo Dharma, a BSE. Currently there are seven BSES in the valley, out of which five were trained in Tilonia, including three women and two men. They operate from the Rural Electronic Workshops (REWS) and receive a monthly salary of approximately Rs 1,700.

Another ray of hope

The success of this project led to another solar electrification project in the same region. Under its Rural Energy Programme, the United Nations Development Programme (UNDP) supplied 90 solar home lighting systems and 75 solar lanterns with 10 years warranty. Under this project, the beneficiaries made a down payment ranging from Rs 3,000 to Rs 500 respectively. Some beneficiaries who made the Rs 500 down payment are under an obligation to pay a monthly fee of approximately Rs 25 for 10 years. "Initially, we had envisaged a lesser down payment of about Rs 500, but we soon realised that all of them were willing to pay Rs 3,000," mentions Bhaskar Goswami, a UNDP consultant with CAPART, who handles the project.

The solar journey

The concept of solar energy is not totally new to the people of Mayad valley. Himurja, the nodal agency of the Union ministry of non-conventional energy sources (MNES), installed a few solar panels in the region, but due to poor maintenance most of them are rendered useless. "Since the after sales service was poor, the panels are out of order most of the time," mentions Puran Singh, the former head of Tingarat *panchayat*. However, now things have changed for the inhabitants of the valley with the solar home lighting systems and efforts of CAPART and SWRC brightening up their lives. ■

Dark side of the coin

Injudicious state policies are not the only ones responsible for California's blackouts

CALIFORNIAN energy crisis is not simply a result of indiscreet state policy. The crisis stems from the combination of high regional natural gas prices, a large drop in hydroelectric power from dry weather conditions, and a demand shock due to the unseasonably warm summer of 2000. Moreover, air pollution regulations and retail price controls have aggravated these factors. These startling facts were revealed in a study recently conducted by the Cato Institute, a public policy research foundation based in Washington DC, USA (www.earthtimes.org, December 1, 2001).

California's Energy Crisis: What's Going On, Who's To Blame, and What To Do, the study, highlights that "the 1996 restructuring law has little to do with the run-up in wholesale power prices", although retail price caps caused blackouts by preventing utility companies from passing on fuel costs to consumers. In 1996, California adopted the Assembly Bill 1980, a state electricity restructuring plan, to allow for retail competition by placing retail price caps on electricity.

According to Jerry Taylor and Peter VanDoren, scholars of Cato, these findings suggest that a new approach to the

California energy crisis is needed. So far liberals, including California's governor Gray Davis, have blamed corporate price and the state's 1996 restructuring law, while conservatives argue that overly restrictive regulations pushed by environmentalists together with the imposition of a central power spot market are to be blamed for the situation.

Taylor and VanDoren examined all the proposed reforms for the energy crisis, from price controls to public ownership, and found that "only a few (in any) accurately diagnose the problem or treat anything beyond the superficial economic symptoms of the underlying disease." So far the main solutions offered have been a state takeover of the industry energy conservation subsidies or adoption of long-term power contracts with generators.

The scholars call for the elimination of retail price caps to promote consumer price responsiveness and voluntary conservation. The argument made in the study is that "given the inelasticity of both the supply and the demand side of the electricity market, even moderate reductions in demand, as a result of freeing prices, would have a major effect on wholesale prices."

The energy crisis in California has worsened over the years, with the winter of 2000 seeing the prices of natural gas soaring to their highest level in 15 years. In April 2001, California's public utility increased the electricity prices by 46 per cent — the largest hike in the state's history (see 'Shocking hike', *Down To Earth*, Vol 9, No 23, April 30, 2001). ■

A vegetarian plan

The European Commission has recently adopted a plan for fostering biofuel production in Europe in a bid to ensure they account for two per cent of all fuels by 2005. The commission said the plan also aimed at a target of 20 per cent inclusion of biofuels by 2020. "This coherent action plan for an alternative fuel strategy will tackle the over dependence on oil-based fuels, which are a significant source of environmental concerns," said Loyola de Palacio, European Union's transport commissioner (www.planetark.com, November 8, 2001)

Flight of fuel cells

Boeing Corporation is getting ready to develop and test an electrically powered airplane to see if fuel cell technology can make jets more ecofriendly. The goal would be to replace jet engines on commercial planes but to use fuel cells and electric motors for auxiliary power instead of gas turbines. Auxiliary power units — essentially small jet engines — are typically in the rear of an aircraft, where they drive generators and compressors to produce electricity and pump air for the plane while it is on the ground and for backup use in flight (*Associated Press*, December 1, 2001).

Smart, green technology

A semiconductor technology that could allow efficient, affordable production of electricity from a variety of energy sources without a turbine or similar generator has been invented. The invention is a result of hard work done by Peter L Hagelstein, a scientist at the Massachusetts Institute of Technology, USA, and Yan Kucherov of The Netherlands-based ENECO Incorporation, a pharmaceutical company. Among other advantages, devices made on the basis of the technology are two times more efficient than their closest commercial competitor. The new technology could have major implications for the recovery of waste heat from power plants and automobiles (www.sciencedaily.com, November 30, 2001).

California: facing a sky-scraping energy crisis



CLEAN RIVERS**WATER VISIONS**

Past experiences in tackling the mammoth problem of river pollution have been disheartening. The recent call for recognising this water source as an ecosystem is a start in the right direction but one that needs to be backed by solid action

MANOJ NADKARNI

“BEING aware of the rapid deterioration of the water quality of our rivers to the extent that in most cases it does not even meet standards for bathing, let alone those for human consumption...we call for certain actions.”—This statement was a part of the draft recommendations of a recently held workshop on river conservation. It voices a serious concern and highlights a nightmarish reality. Unfortunately, in most cases, the remedy gets drowned in the rhetoric. This time, however, the anxiety expressed for the state of rivers, echoed in unison at the “National workshop on conservation of rivers and floodplains in India”, appeared genuine. The workshop, organised jointly by School of Environment Sciences (SES), Jawaharlal Nehru University (JNU) and the Union Ministry of Environment and Forests (MEF), even if it did nothing else, pointed out the magnitude of the problem.

It would be an understatement to say that almost all the rivers of India are heavily polluted today. We know this and government departments know this. But the pertinent question is what can be done to adequately address the problem? A M Gokhale, additional secretary, MEF, said in his opening remarks that whatever conclusions are reached at the end of the workshop will be used as a vision statement, ultimately leading to the formulation of a bill to be used to protect rivers. Though India has extremely stringent pollution laws, so far, most plans and programmes to improve the situation have fallen flat with little or negative impact. The first plan to clean up an entire river in India was put into action in 1985. This was the Ganga Action Plan (GAP), which in its supposed five-year first phase, was to reduce the pollution stress on the river.

Sixteen years later, the river is actually more polluted than it was when the plan was initiated. (It is another matter that completion of first stage was delayed by a decade.) The plan was able to meet only 39 per cent of its target of sewage treatment, GAP’s primary goal. Despite investing vast sums of money, most of the treatment plants constructed, failed to function to the needed capacity. According to MEF statistics, six of the 20 major river basins in India suffer from water scarcity and water has already become one of the most limiting resources in the country. Worse, the little there is, is polluted. Situations like these prompted the MEF (river pollution comes under their remit) into organising such a workshop, in the hope of finding some solution.

The motives were right and the intentions honest. Almost 250 invitations were sent out, covering those in the government, academia and non-governmental organisations (NGOs). One expected a big turnout at the opening session of this workshop, dealing as it was with a subject that is basic to agriculture, industry, biodiversity, health, urban and rural development, let alone a basic necessity like drinking water. But the presence of barely 25 people, is perhaps indicative of the importance given to cleaning up our rivers. It is interesting to speculate how many people would have turned up if the workshop was about *using* river water. What was heartening was that those present represented diverse areas related to river ecosystems and were vocal participants.

A much needed paradigm shift was emphasised: this was to recognise rivers as an ecological entity that did not necessarily fit into geological, political or economic boundaries and not merely as a channel carrying water and a conduit for wastes. This meant recognition of the fact that to



preserve the health of a river it was essential that the integrity of all the different elements that make up the river was maintained. It also meant that all inland water bodies, earlier seen as distinct entities, were seen as a vital part of this riverine ecosystem. Partly this suggests that we need to take a serious look at our treatment of rivers and admit that the way we have been doing things is what is destroying them. We need to adopt a holistic approach to rivers, together with their floodplains, as ecosystems which are directly influenced by their drainage basins. On this, the workshop rang a positive bell.

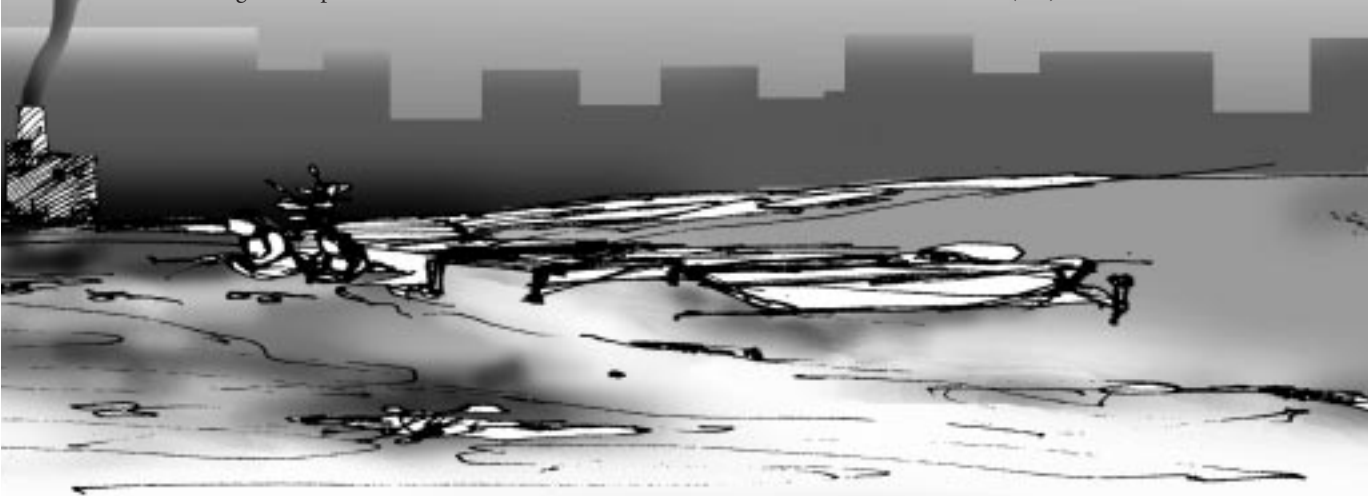
Past attempts to clean up the rivers have always been on piecemeal basis. No conservation or cleaning up plans had ever considered the river and its catchment area as an ecosystem. Floodplains, basins and catchment areas were not the words one would hear or read often when the topic was river conservation. This crucial point was emphasised in the opening statement by Brij Gopal, professor at SES and convenor of the workshop. So far, most actions have been geared towards end-of-pipe engineering solutions. This is basically saying 'you pollute as much as you want and we'll clean it up for you.' And it is not as if the cleaning attempts have in any way been successful. There are numerous instances about how money has been wasted. Sewage treatment plants constructed in West Bengal under the GAP are nowhere connected to the river Ganga. Pollution monitoring laboratories constructed at a cost of crores of rupees lie idle while all the testing is done from outside laboratories.

While problems of infrastructure and political expediency need to be addressed, it is the non-holistic treatment of the rivers that have led to the failure of most plans. Even at the workshop, though it was decided that river would be treated as an ecosystem, fissures were visible among the participants, some of whom wanted to prioritise their own concerns. This brings out in sharp focus another major problem, that of use of river water. Which use, for example, agriculture, sewage disposal or fisheries, has a higher priority? This is the question of abstraction, taking water out of the river. The supposed natural cleaning ability of a river depends on certain amount of flowing water being maintained. If too much is taken away, the river starts dying. This amount, called the minimum flow, needs to be determined for each river and each stretch of river. Only after that can other demands be quantified. This conclusion led to the general agreement in the workshop that there is no such thing as "surplus water" as far as a river is concerned.

Aspects of conserving biodiversity, pollution control sedimentation and drinking water supply are all dependant on some amount of water flowing in the river channel. All abstraction comes at a cost. If decisions are to be taken on how much water can be taken from river, these decisions should be based on scientific understanding of minimum flow. MEF additional director in the National River Conservation Directorate, R Dalwani, admitted that the ministry was not confident about how much minimum flow was required by a river. Because of this, minimum flow is given least priority at the time of deciding the priorities of distribution of water, she said. MEF has arbitrarily decided 10 cubic metres per second as the minimum flow and she admitted that this was a questionable figure. The workshop identified this as a research and policy priority. A positive step that would result from this is that instead of a river having a prescribed minimum flow, the abstraction could be minimised and the maximum possible amount of flow always be maintained. So when the question of distribution arises, if necessary, water needs could be met from other sources rather than rivers, such as wastewater irrigation.

This would also mean that education and awareness would always have to be a part of any river conservation scheme so that stakeholders, beneficiaries and polluters know their obligations right from planning stage. This would especially hold true for municipal bodies who would have to raise funds to sustainably manage their riverine based resources and the development projects impacting on them. But the main question is will the workshop really result in some action? MEF wanted a vision statement and a draft policy that they would use to plot their future course. Will this actually happen? As usual there is a problem. As the chair of the final session of the workshop suggested to one of the new entrant to these workshops — who was caught up with the idealistic suggestions generated at the beginning of the workshop — that recommendations had to be "made palatable" to the government departments dealing with rivers and their water. So the radical suggestions and forceful thinking representative of the start of the workshop were watered down. And of course, as usual, it was suggested that another workshop be held and some committees and institutions be set up. In which, no doubt, many of the participants will find warm and comfortable homes. ■

Manoj Nadkarni, heads the river pollution unit at Centre for Science and Environment (CSE), New Delhi



Nurturing the future

A comprehensive set of rules is essential to regulate research and facilitate commercialisation in biotechnology.

PATRICIA SIERRA BLÁZQUEZ, director of the Centre of Molecular Immunology (CIM), Cuba, talks to **VIBHA VARSHNEY** on the growing importance of biotech products in the present day health scenario

What is the need of regulating biotechnology?

Biotechnology products have acquired a special significance today as they can be used to cure diseases where conventional drugs have failed. Unfortunately, despite a growing demand for these products, the existing regulations are not comprehensive enough to address the market needs adequately.

What kind of guidelines should be formulated in this field?

Though standards for use of biotech products have been set by World Health Organisation (WHO) and International Commission of Harmonisation (ICH), they are not adequate. The main problem is that the two bodies have followed different criteria while laying down their guidelines.

It is, therefore, imperative that each country lays down rules and regulations that clearly outline its own requirements. It is also necessary that while framing them, demands of the market is kept in mind. For example, if a country is targeting Japan for its products, it should adhere to ICH rules which are applicable there.

What are the other factors to be considered while drafting these rules?

It is important to ensure that the rules formulated are logical, keeping in mind the limitations of biotech products. For instance, toxicity of conventional drugs can be tested by studying the breakdown products in the body. But such a test cannot be carried out in the case of biotech products like novel proteins, where the breakdown process is not understood. Moreover, it is not possible to determine how these drugs would behave inside the body.

Thus, only the relevant tests should be carried out and this can be decided in technical discussions between the producers and the regulatory body. As the field is relatively new, it is necessary that both parties keep an open mind about these tests. Discussing each case separately would be a good way of understanding the intricacies involved in testing the product.



VIBHA VARSHNEY / CSE

What are the regulations in Cuba on use of biotechnology products?

To ensure that the product is acceptable in the country buying it, we strictly adhere to the international standards. Since we are not catering to the needs of Cuba alone but are actively exporting the antibodies to other countries, we follow both WHO and ICH rules depending upon the market.

How is biotechnology being used in the present day health scenario?

The technique is currently being employed in preparation of monoclonal antibodies (antibodies derived from a single cell which are identical and targeted towards a specific disease). Antibodies are normally produced in response to an external stimulus such as a disease causing organisms. If multiple copies of specific antibodies, directed towards a pathogen can be prepared, they can be used to boost the immune system. Biotechnology is being used to prepare such copies. Initially, monoclonal antibodies (MABs) were developed using mice and these had undesirable side effects like the production of anti-mouse antibodies in humans. To counter this and increase the efficacy of the antibody, different techniques are now being employed to

prepare antibodies that are similar to the original structures found in humans. One of the ways is by inserting human antibody producing genes in mice and suppressing those of the rodent.

Can biotech products be used for treating cancer?

MABs have been considered to be magic bullets in case of cancer treatment and this can be gauged from the fact that 51 per cent of the clinical trials using these antibodies have been carried out in this particular field. CIM has developed h-R3 — a receptor against the epidermal growth factor (EGF) responsible for the spread of cancer. Clinical trials using these are being carried out in Cuba and Canada. So far, the MAB has been tested in patients with certain types of advanced tumors. Different amounts of the antibody were given to 12 patients through a single intravenous infusion. While the patients did experience tremors, nausea, fever and hypertension, there were no allergic reactions or signs of liver damage. The antibody was then tested on patients suffering from advanced head and neck cancer in combination with radiotherapy. Patients were given six-weekly doses of the antibody and the cumulative dose ranged from 300 to 2400 milligramme. It was found that the treatment worked well in combination with radiation therapy.

What are the problems facing the Indian biotech research?

The main problem here is the lack of infrastructure. I am sure there must of thousands of antibodies that are available in India but there is no way that this research can be carried forward and commercialised. In Cuba, the biotech centres take care of all the aspects such as research, production and commercialisation. Also there is a lot of effective networking within the centres. For example, when a drug is developed, it is sent to special centres, which are authorised to carry out toxicological studies on animals and this helps in time and resource management. Such a collaboration would be extremely useful in India. ■

Exploding the myth



THE EVOLUTION EXPLOSION: HOW HUMANS CAUSE RAPID EVOLUTIONARY CHANGE*

Stephen R Palumbi • W W Norton & Company • New York • pp288 • US \$24.99

PRANAY LAL

HARVARD scientists have a place in the sun when it comes to biology. And with mentors like E O Wilson, the university faculty has a particularly tough act to follow. Stephen Palumbi — a professor of biology and a relative newcomer to Harvard — has, however, overcome any such limitation to produce a brilliant follow-up to Wilson's work. The book convinces that evolution is a fact, not a theory: a process that may manifest its effect in a few generations rather than spanning millions of years. By manipulating genes and rewriting the laws of natural selection, human actions have accelerated the evolutionary game. This is particularly evident among the species that live close to us, the animals we domesticate or devour, the pests that share the food we grow, and the microbes that surprise us by rapidly changing the very nature of the disease they cause.

Last few decades have made it amply clear that evolution can take place much more rapidly than Darwin ever imagined. Ever since penicillin was introduced in 1943 and declared a silver

bullet, humans have haphazardly used antibacterial agents in soaps, face washes, cosmetics and even drugs, unaware that the war against bacteria was only just beginning. For most part, therefore, the author talks on the microbial evolution: the AIDS virus, the bacteria that cause tuberculosis and others responsible for some common infections.

The book begins with a trip to Hawaii to secure some rare snails for captive breeding — a process that entails an evolutionary pattern that is different from the one taking place in a natural habitat. Study of this human-driven evolution enables Palumbi to look into the wider issue of bacterial resistance to antibiotics. It is observed

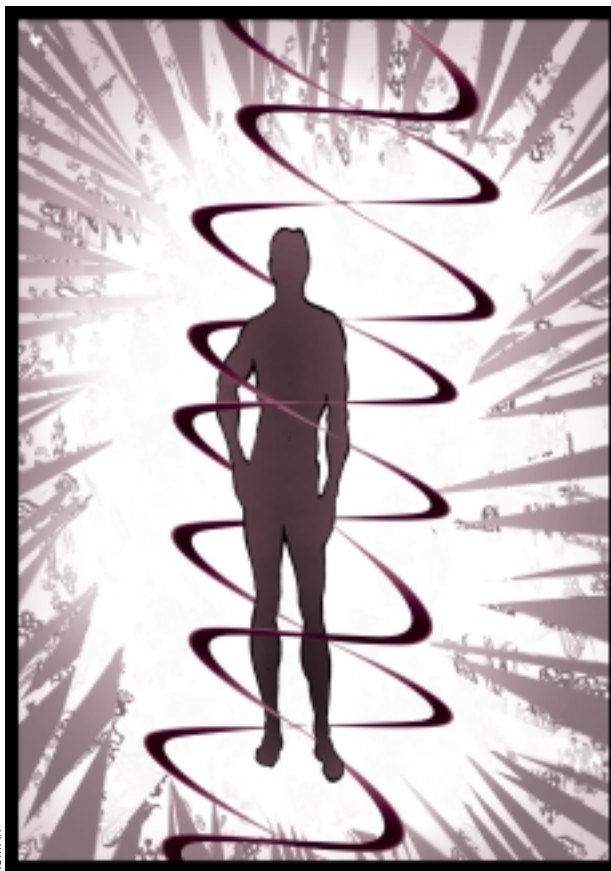
that antibodies are not enough to contain the bacteria that invade our bodies and ultimately evolve to prosper. These strains of bacteria arise only a few years after a new antibiotic is released and vary from one to 36 in number. According to Palumbi, using multiple antibiotics can be an effective strategy in tackling this problem. More dreadful, however, is the impact of the AIDS virus which is also mutating with time to develop resistance to the latest cocktail of drugs. The evolution of the AIDS virus becomes the focal point of this engaging work as the microbe is changing its form with amazing alacrity to defeat all human endeavours aimed at countering its attack. Palumbi also talks of pests that have evolved to survive pesticides of many kinds. Discussion of these creatures is pertinent here as they threaten crops around

the world in a time of ever-increasing scarcity. The author shows how it is not enough to spray our fields with pesticides or virulent micro-organisms (biopesticides). Inevitably, the pests will evolve to flourish in the new pesticide-filled environment just as antibiotics are not enough to contain the bacteria that strike human bodies.

In other words, at the centre of this change is the “evolutionary engine” that is continually at work, adjusting organisms to their environments. Change the environment of an organism and the organism changes to keep itself fit — a never-ending phenomenon that frustrates human efforts to eradicate harmful pests and deadly diseases. Human efforts to combat the scourges of field and body are now seen as just one half of the predator-prey, parasite-host phenomenon of co-evolution. All this, Palumbi writes, is “evolution with teeth”. Whether we can survive our own power to reshape the earth remains an open question. But, he concludes, ideas evolve too, so that we can hope against hope to think our way back to more or less normal cycles of evolutionary change.

Well-written and provocative, the book makes for a useful start in new evolution syndrome. En route to bringing us up to speed on rapid evolutionary change, Palumbi sets some sort of record for the use of colourful language.

Anyone seeking an eloquent explanation of recent evolution as it relates to human impact — from the use of herbicides, pesticides and antibiotics to AIDS treatment and genetic manipulation — should find “The Evolution Explosion” a worthwhile read. ■



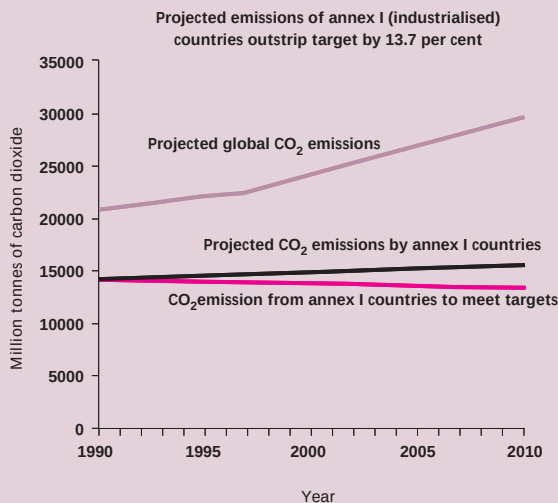
KUMAR

All gas

Negotiations over the past four years have diluted the already weak Kyoto Protocol signed in 1997. The protocol requires industrialised countries to reduce emissions of heat trapping gases like carbon dioxide to about five per cent below 1990 levels. This target is to be achieved between 2008-12. At the latest round of discussions in November 2001, countries such as Japan, Canada and Australia managed to extract major compromises from the EU and developing countries. In its present form, the protocol fails to deter the industrialised countries from defaulting on their commitments. It does not take the bull by its horns.

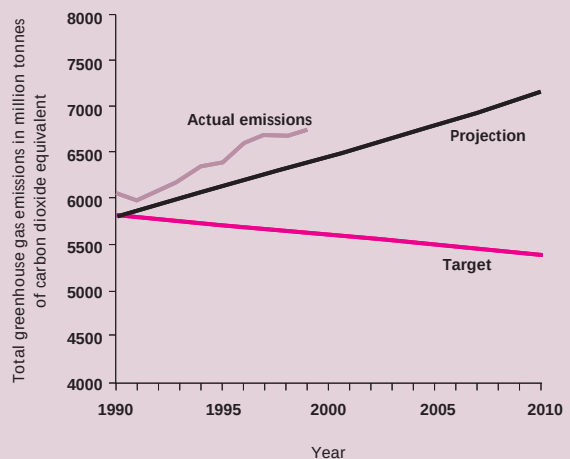
Hoax!

With projections shooting far above the targeted reductions the protocol promises to be a farce



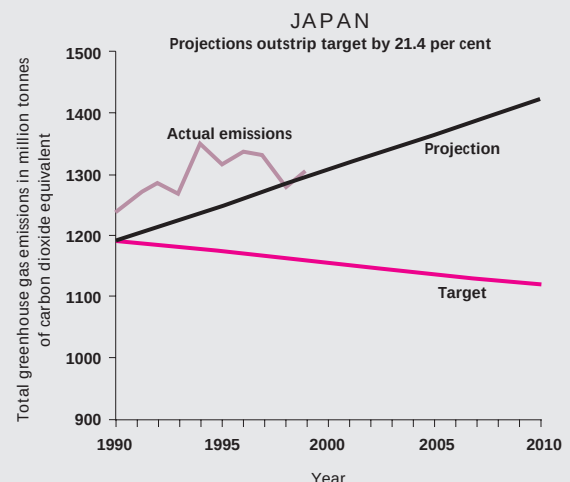
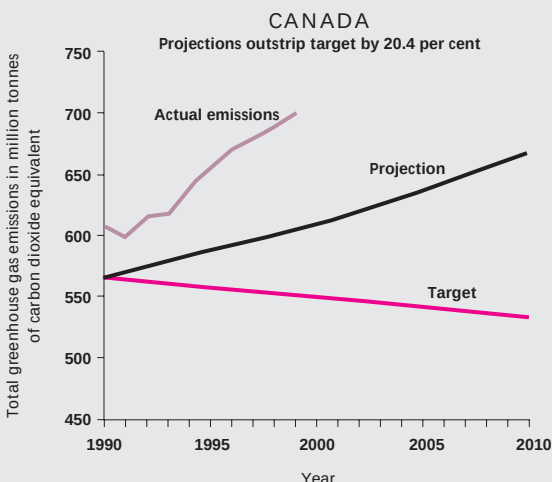
The rogue nation

The US refuses to sign on to the lenient protocol. Its emissions are projected to outstrip the target by 24.3 per cent



Diabolical duo

With the exit of the US from the Kyoto process, Canada and Japan have squeezed out enormous concessions from the protocol. However, they are hardly prepared to meet their commitments



Note: Actual and projected emissions are of six greenhouse gases except where otherwise mentioned (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride)

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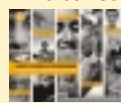
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A comprehensive Life Cycle Analysis (LCA) approach for assessing the environmental performance of pulp and paper industry in various phases of life cycle ranging from raw material sourcing to pollution generation and control. (Pages 344)

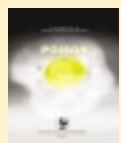
PB: Rs 5000 / US \$125

2. Green Schools Programme manual



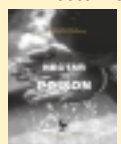
This manual is designed as a self-learning and assessment tool so that teachers can work with students to audit their use of natural resources and to experiment with environment friendly practices. (Pages 78) PB: Rs 125 / US \$10

3. Poison vs Nutrition



A briefing paper on "Pesticide Contamination and Food Safety" — The CSE studies on pesticides in water and soft drinks, pesticide contamination and its health impacts, regulatory apparatus and processes, right to clean water and the industrial use of water. (Pages 74) PB: Rs 250 / US \$20

4. Nector To Poison



A briefing paper on Arsenic Contamination of Ground Water — an exhaustive set of FAQs on key issues, it's causes, spread and technology available to mitigate the effects. Contains an exhaustive database of resource person and institution working in the area. (Pages 58) PB: Rs 100 / US \$8
PB: Hindi Rs 100 / US \$8

5. 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. (Pages 456) PB: Rs 490 / US \$22

6. Fourth Citizens Report (SOE-4): Dying Wisdom Edited by: Anil Agarwal, Sunita Narain

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In-depth analysis of the environmental performance of major players in the Indian automobile sector during the various stages of its life cycle. Also analyses technological issues, comparative analysis of best practices with global players and recommends future outlook. (Pages 238) PB: Rs 490 / US \$18

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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

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A case of environmental colonialism. (Pages 34) PB: Rs 30 / US \$6

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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) PB: Rs 190 / US \$10

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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) PB: Rs 290 / US \$12

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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) PB: Rs 190 / US \$10

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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) PB: Rs 590 / US \$33

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