

HEALTH & ENVIRONMENT

NEWSLETTER FROM THE CENTRE FOR SCIENCE AND ENVIRONMENT

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EDITORIAL ▶

The SARS virus is big news. Understandably. It is a virus, mutant and mysterious, which in this extremely small and well-connected world is capable of being transported within days across the globe. Globalisation means that it can move from the remotest and poorest of villages to the homes of the richest. It is of no small credit and achievement that the world science and administrative authorities are working overtime to diagnose, investigate and take precautions to keep the disease from spreading. Creditable. Impressive.

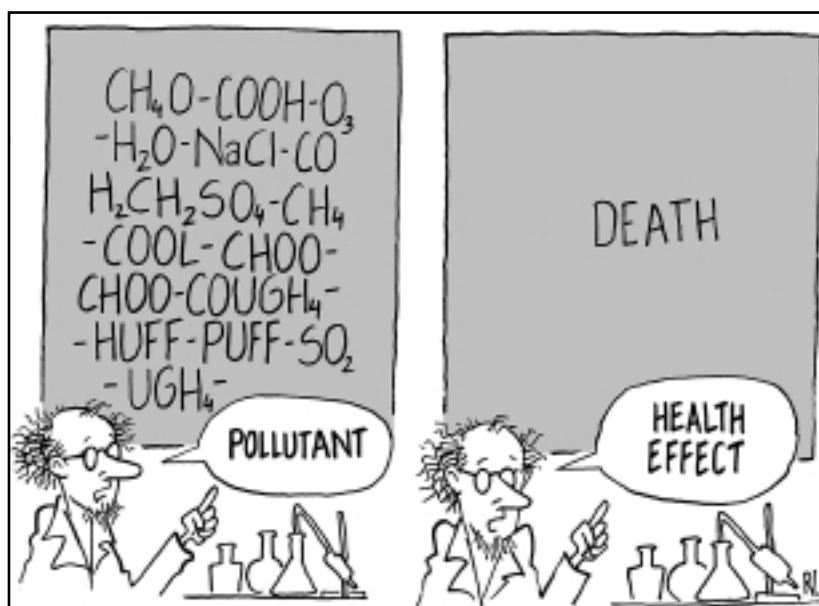
But put another way, it is also shameful. Where is the same global leadership and determination when it comes to countless diseases that threaten the poor? From the acute lower respiratory infection, which according to academic and lifelong campaigner Kirk Smith kills 8200 people each day, to malaria, tuberculosis and the AIDS pandemic, global commitment to eradicating diseases has never been more wanting or pathetic.

This is also true of the growing problems of arsenicosis and fluorosis. The extent of the problem and enormity of the tragedy caused by these diseases in the subcontinent is indeed shocking and frightening. We are literally talking about the crippling of these countries. Perhaps deliberately.

Because what is rarely understood is that these diseases are related to the state of groundwater. Studies done in the arsenic-affected belt show that concentration

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RUSTAM VANIA / CSE

CLIMATE CHANGE AND HEALTH

Suffering progress

Rising global temperatures will result in 290 million more cases of malaria worldwide

About 2.5 million premature deaths will occur every year in India due to air emissions

Asthma, diarrhoea, dengue, cancer, malnutrition will burden public health

Climate change is bad news for global human health. And fossil fuels are the greatest culprits. Studies have shown that the atmospheric accumulation of gases stemming primarily from fossil fuel combustion could increase the global surface temperature by 1.5-4°C. Global warming will expand the range and incidence of vectorborne diseases, increase the incidence of pathogens in freshwater and exacerbate heat-stress related mortality. This might be accom-

panied by the ill-effects associated with ozone depletion, caused by emissions of chlorofluorocarbon (CFC) gases. Effects would include increased skin cancers and cataracts, as well as possible impacts on the human immune system that may weaken resistance to some infectious diseases.

Projections show that by the year 2100, the global average surface temperature will rise between 1.4°C to 5.8°C. The twentieth century has

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increases with depth in the aquifer — peaks around 100-125 feet down — and gets reduced as it reaches 400 feet down. The fluoride-groundwater link is clear but its geographical extent is not known. No one region can be identified as chronically or endemically fluoride-prone.

It is also ironical, that in some ways, both arsenicosis and fluorosis, are the result of efforts to eradicate other equally killing diseases — caused by dirty drinking water. In the 1960s and 1970s, national governments and international agencies drew up detailed plans to provide safe water to all. They understood, rightly, that bacteria in water kills more babies than any other substance. They believed the water on the surface — in millions of ponds and tanks and other water harvesting structures — was contaminated and so invested quickly in new technologies to dig deeper and deeper into the ground. Drills, borepipes, tubewells and handpumps quickly became the triumphalistic instruments of public health missions.

Then the water table started to fall. Investment were made to dig deeper. And here is where the story turns. While government was well-intentioned in its quest for clean water, it was equally callous, indeed criminal, when it came to responding to the news that was filtering in that maybe, just maybe, these 'strange' diseases are linked to drinking water. It responded with denial and caused confusion by misinformation. Science and its uncertainty became the servile tool for inaction.

The answer to the problem, therefore, is not the management of the disease. The answer is in the management of water. We are threateningly dependent on underground aquifers for our drinking needs. At the same time, technological advancement is helping us reach lower and lower into the earth to search for water. What we desperately need is strategies to ensure that the abstraction of water does not exceed the recharge of the groundwater aquifers.

Most of the victims — the patients remain unknown. They only know that they are ill. Very ill. Sometimes doctors diagnose their ailment. Sometimes not. But they still have no option but to drink the water that is poison.

This SARS we are dealing with has no cure. Only prevention will work.

— Sunita Narain, Director
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What is climate change?

The short wave energy received from the sun is absorbed by the atmosphere, ocean, ice, land and living organisms, whereas the long wave radiation emitted by the warm surface of the earth gets partially absorbed by trace gases in the atmosphere called greenhouse gases (GHGs). The main natural greenhouse gases are water vapour (H₂O), carbon dioxide (CO₂) and methane (CH₄). There is usually a balance between the energy absorbed from solar radiation and the deflected radiation from the earth and atmosphere. Increased levels of these GHGs in the atmosphere are responsible for the increase in the global temperature. Since 1975, average world temperature has increased by approximately 0.5°C and climate change could be due to accumulation of GHGs in the lower atmosphere. This climate change encompasses temperature changes on global, regional and local scales, and also changes in the rainfall, winds, and possibly ocean currents.¹ In India distinction between seasons has blurred. The monsoon season has disappeared in Delhi. A mere two degree celsius rise in temperature along with a seven per cent rise in rainfall would result in a cut down of 12 per cent of agricultural revenues for India. States like Uttar Pradesh, Haryana and Punjab would record a 10 per cent reduction in the production of wheat, thereby jeopardising food availability of the country.²

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been witness to unprecedented economic activity — an almost twenty-fold rise over the previous decade — a major cause of climbing temperatures.

In addition, there has also been a dramatic increase in the world population that has now exceeded the six billion mark. This is accompanied by a marked depletion in the earth's natural resources, radically changing the global environment.¹ By destroying forests, damming rivers, letting wetlands decay and disturbing climate patterns, human actions are undermining ecological safety nets. Climate change results in fluctuations in weather patterns, blurring of seasons, increase in sea-levels, melting of glaciers and depletion in ozone level. Climate change also results in a fall in agricultural productivity, increase in number of infectious diseases, instability in water supply and the dying out of many species of plants, animals and birds. (see box: *What is climate change?*).

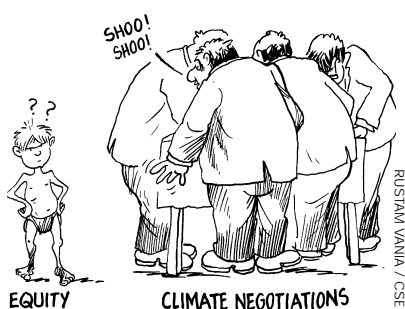
According to *The World Health Report, 2002: Reducing risks, promoting healthy life*, climate change claimed 154,000 deaths through diarrhoea, malaria and dengue fever in 2001.² With production yields decreasing and disruptions in food supply, undernourishment is going to increase. This could well translate into more cases of stunted physical and intellectual growth

in children, low productivity in adults and their susceptibility to infectious diseases. Increase in carbon dioxide emissions is also known to negatively affect the photosynthesis process in plants, leading to an epidemic of malnutrition (see box: *A malnourished world*).

In 1990, out of the 21 billion tonnes of carbon emissions globally, 14 billion tonnes were emitted by rich developed countries, with the US alone contributing five billion tonnes.

Power games

In 1992, 165 nations signed the United Nations Framework Convention on Climate Change (UNFCCC) to combat climate change. The Kyoto Protocol was adopted under UNFCCC in 1997 and it laid down a timetable for industrialised countries to reduce their greenhouse emissions by at least 5.2 per cent compared to 1990 emissions levels by 2008-2012. The US agreed to reduce emissions by seven per cent, Japan 6 per cent and European Union by 8 per cent below 1997 levels. The Protocol also allowed any country committed to reducing emissions, to gain credit points by setting up projects in developing countries that helped to reduce the amount of greenhouse gases (GHGs) in the atmosphere. In 2001, the US refused to go ahead with the Kyoto Protocol, citing reasons such as it



"being unfair to the US economy", "CO₂ is not a pollutant", and "the science of global warming is as yet unsure".³

There now exists a tug-of-war between the developed nations, which are not so vulnerable to climate change, and the developing nations, which are extremely vulnerable. The industrialised nations are unwilling to water down their lifestyle and are resistant to taking on the expenses of shifting to a low-carbon economy and on the other hand, the industrialising nations are unwilling to freeze their growth and are resistant to taking rich nations' emission-reducing burden.⁴ Right from the beginning of the Protocol, the US had demanded equal participation from developing countries, especially India and China, saying it would sign the Protocol only if these countries did so. At the recent

eighth Conference of Parties (CoP-8) held in New Delhi in October 2002, the US however refused to ratify the Kyoto Protocol even if India and China signed it, arguing that each developing country should develop its own response to climate change, making a complete U-turn to its earlier stance on climate change.⁵ And so the war goes on, while the world continues to warm up more and more.

The most disturbing part is that no one really knows as of now how much warming will occur, how fast will it occur, and what will it be its real adverse effects. What remains a mystery is how much the impact will be within a specific given location. Sophisticated computer models which will help predict how things may change in smaller places, have yet to be developed. *The World Report on Disasters 2002*, cautions on the increase in the number of floods, earthquakes and volcanoes in the coming year. Between 1992 and 1996, around 75 floods were reported annually, globally. Compare this to 2001, wherein for the second year in running, the number was above 150⁶ (see box: *Nature games*).

A many-faced monster

The increase in global surface temperatures has serious consequences for

India. The geographical location of India makes it very vulnerable to climate change and the country is likely to suffer damage to agriculture, food and water security, human health and coastal population.⁷ The sad part is that the Indian government does not see climate change as an issue warranting immediate attention. Shreekanth Gupta, professor at Delhi School of Economics admits, "Climate change in some ways is perceived as a distant issue. There is hardly any interface between the scientists and the policy makers to think of strategies to mitigate this impending catastrophe."

Norman Myers, from the University of Oxford, UK, says, "In the last 10 years, India has incurred a loss of US \$10-12 billion — about three to four per cent of the gross domestic product (GDP) because of damages to the environment and the natural habitat." According to him, rising sea-levels will also affect India. "Around 23 million Indians in the eastern coast comprising West Bengal and Orissa will have to abandon homes because of the rise in sea-levels."⁸ Whenever there is rise of one-metre in sea-levels, seven per cent of the population in Goa will be adversely affected, and there will be damages to the tune of Rs 8,100 crore. Beaches like Calangute, Miramar and Colva will be washed away.⁹ In Maharashtra, over 13 lakh people are at risk due to rising sea-levels. The cost of damages for Mumbai, the business capital of India, is estimated to be Rs 2,28,700 crore.¹⁰ The country's icescape is changing, with the Gangotri glacier receding by 500 metres, and the Ganga's average temperature is now up by one degree centigrade.¹¹ The melting of the Himalayan glaciers would mean less water in major rivers like the Ganga, the Indus and the Brahmaputra, affecting even the hydro-power stations which are dependent on the melting of glaciers.

The extreme weather conditions and the heat waves experienced in various parts of India have led to clear indications that climates are changing. India has been facing a drought for three consecutive years. Kashmir no longer experiences the fifth season of *sont* (spring), which used to last for

A malnourished world

By 2100, plants will be exposed to approximately 550 parts per million of CO₂. Rising levels of CO₂ makes plant barren and denudes them of vital micronutrients such as iron, zinc, selenium and chromium. A raised level of CO₂ increases photosynthesis, which ruins the plant growth, stifling the plants capacity to absorb nutrients, hence making fewer amounts of nutrients available. Studies on rice show a decline in nitrogen levels by 14 per cent, phosphorous 5 per cent, iron 17 per cent and zinc 17 per cent.

Almost 84 per cent of our calorie intake is provided directly by plants. Plants provide us with 32 nutritional elements, 24 of which are essential for the human body. Decline in micronutrients like iron, leads to mental and physical impairment affecting almost 3.5 billion people — over half the world's population. Pregnancy complications resulting in poor growth and health in childhood can be attributed to zinc deficiency in the diet of the pregnant mother.

Sums up Irakli Loladze, biologist with the Princeton University, New Jersey, USA, "To avoid malnutrition you have to consume more calories. To keep the same calorie intake, you have to accept a diet low in essential elements. In either case, not a healthy choice."¹

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Nature games

Climate change is irreversible. Though no one knows how the climate will respond, it is certain that increase in GHGs could lead to a sharp rise in global temperatures.

Projected climate change scenario

Year	Ground level ozone concentration parts per million (ppm)	Carbon dioxide concentration (ppm)	Global temperature change (°C)	Global sea-level rise (cm)
1990	-	354	0	0
2000	40	367	0.2	2
2050	-60	463-623	0.8-2.6	5-32
2100	>70	478-1099	1.4-5.8	9-88

Source: IPCC: Third Assessment Report 2001, Climate change 2001 impacts, adaptation, and vulnerability, Contribution of working group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change, p 27.

30-45 days during March-April. It now becomes warm in early February. Warmer climates have also resulted in the quicker melting and retreat of glaciers. With climate change affecting the bird population and causing a decline of butterflies in the entire Himalayan region, it is mosquitoes that swarm the areas today. Skin diseases and infections are now more common in the children of this area.¹² Orissa is another classic example of how climate change has played havoc with its people and land (see box: *Ripped apart*).

Compared to 39°C in April 2002, Delhi in April 2003 is witnessing a summer of 41°C and the season has just begun. The year 2002 saw more than 1,100 people dying due to the heat waves sweeping the whole of India, with Andhra Pradesh reporting around 1,000 deaths. Vijaywada had the worst summer in 96 years, Darjeeling also recorded high mercury levels and Kochi in Kerala witnessed weekly changes in the climate.^{13,14}

Heat affects almost all the body systems. A 2°C rise in temperature can well double the number of heat waves across the world.¹⁵ R K Singh, Lecturer, Civil Engineering Group, Birla Institute of Technology and Science (BITS), Pilani, says, "Temperature change may have an impact on several major categories of disease including cardio-vascular, cerebrovascular and respiratory diseases."¹⁶ High temperature makes it tough for the thermo regulatory system of the body to maintain the equilibrium temperature of

the body. Therefore, cardio-vascular and stroke deaths are likely to be major contributors to any excess mortality due to global warming.¹⁷

Conversely, a potential health benefit of warmer global temperatures could be fewer cold-related deaths, as winters become milder. Yet, experts believe that the decrease in mortality will be negligible as compared to the increase in mortality resulting from global warming; studies indicate that higher mortality is generally associated with heat waves than cold spells.¹⁸

Deluge and disease

The increase in the frequency and intensity of floods, storms, droughts and cyclones affects health through loss of shelter, migration of people, contamination of water supplies, loss of agricultural yield (thus leading to hunger and malnutrition), thereby increasing the risk of diarrhoea and also causing damage to health care infrastructure set up in a particular area. The reduction in fresh water supplies affects water resources and sanitation. This in turn reduces the water available for drinking and washing. With the lowering efficiency of local sewer systems, the end result is a higher concentration of bacteria and other microorganisms in raw water supplies. Water scarcity may force people to use river water for their essential needs, which is often contaminated, leading to an increased incidence of diarrhoeal diseases. Many Pacific Island countries report high incidences of diarrhoea during

high temperatures and extremes of rainfall.¹⁹

With water becoming scarce and populations increasing, there is an increased pressure on water availability and water quality. Deep digging of bore wells for groundwater makes the contamination levels of arsenic and fluoride rise considerably. Already 26 states of India report incidences of fluorosis, and arsenic affects nearly 6 million people in West Bengal alone.

Increase in temperature correlate with increased populations of some microorganisms that cause waterborne diseases, such as *Vibrio cholerae* bacterium, which causes cholera. Higher ambient temperatures foster the growth of pathogens that thrive in or on food, such as *Salmonella*.²⁰ The

Hot impacts

Rise in temperature could lead to:

- Submerging of small islands like Tuvalu and Lakshwadeep
- 290 million additional cases of malaria¹
- Increase in allergies due to increase in the pollen count per plant²
- More of asthma cases
- Increased incidences of diarrhoea and cholera
- More deaths due to heat stress
- More of droughts and floods
- Melting of glaciers
- Increase in average number of tropic disturbance days from 17 to 29³
- Increase *El Nino* effects — the periodic warming of Pacific waters
- More of skin cancer cases due to exposure to UV light



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cholera organism is known to live in sea-borne plankton that blooms as the sea surface warms. The 1991 outbreaks in Peru is cited as circumstantial evidence for this chain of events, because it spread extremely quickly and took place when an *EL Nino* (warming of Pacific waters) had warmed Peru's coastal waters.²¹ Changes in the *El Nino* Southern Oscillation (ENSO), a major source of climate variability is known to influence cholera cycles. Increasing temperatures make ENSO stronger and more variable. Since the cholera virus thrives in brackish water and warm temperatures, it becomes more sensitive to climate patterns, leading to more frequent outbreaks.²²

Vector borne diseases

Driving the predicted rise in infectious diseases are changes in temperature, rainfall, and humidity, which give bugs a boost. Hot climates make pathogens spread over a wider range, and increase their survival rate. Heavy rainfall increases the mosquito population, which triggers an epidemic of malaria. Most of the vector-borne diseases occur in populations, which are unprotected, lacking basic public health measures and adequate sanitation facilities. An increase of 3-5°C in the temperature translates to about an extra 50-80 million cases of malaria in a year.²³ In India, Rajasthan and Gujarat have reported high incidences of malaria during heavy rains.²⁴ Similar relationship has been reported in the years following *El Nino* and during *La Nina* (the cooling of the Pacific waters) after the *El Nino* phenomenon.²⁵

Shorter incubation periods result in a threefold higher transmission rate

of malaria. Smaller adult mosquitoes are born in higher temperatures and they need to feed more often to develop into eggs, which, in turn, increase the chances of disease transmission. What is more disturbing is that this may result in a break down of prey-predator relationship like that of frogs and mosquitoes, leading to an increase in vector numbers.²⁶ The scenario is grim in East Africa where the temperatures have increased by 0.15°C per decade from 1970 to 1998, and a rising trend in malaria is being noticed.²⁷ With a vast percentage of the Indian population living in areas prone to malaria and a limited public health infrastructure, increased temperatures is going to create havoc with malaria transmission increasing to higher latitudes and altitudes. The World Health Organisation (WHO) has already recorded "quantitative leaps" in malaria incidences in the recent years.²⁸ High temperatures speed up the life cycles of the mosquito as well as the disease organisms that the mosquitoes harbour and make the adult mosquitoes bite more.

In a temperature of 32°C, the dengue virus takes just seven days to incubate in the *Aedes aegypti* mosquito, whereas in a temperature of 30°C it would have normally taken 12 days to incubate. In 1996, New Delhi, India witnessed a major dengue outbreak, with over 10,000 cases and 400 deaths.²⁹ Another epidemic was reported from Ludhiana, India in the same year, the first of its kind in that region.³⁰ The vector of dengue has also started moving towards the mountain regions with cases coming in from Jammu. This clearly shows that dengue as a disease is spreading to new areas within the country thus posing a public health hazard.

Climatologists at the US National Aeronautical Space Administration (NASA) are now linking the breakouts of Bartonellosis, an insect-borne highly fatal disease to *El Nino*. Bartonellosis causes life-threatening anaemia and manifests itself in blood-filled, wart-like skin lesions. Cusco, in Peru, which witnessed the strongest *El Nino* event in 1997-98, also reported an outbreak of this disease during the same period, making

scientists believe that *El Nino* was the dominant factor in the epidemic.³⁰

Air pollution and health

Climate change could well alter the rate of chemical reactions in the atmosphere that destroy pollutants, or influence the factors such as wind and precipitation that regulate how pollutants accumulate or disperse. For example, higher temperatures favour

Ripped apart



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Floods. Cyclones. Droughts. Famines. Orissa has them all. The monsoon of 2001 saw the worst ever flood recorded in Orissa, with 25 of the 30 districts being inundated with water. Bhubaneswar, which once had a forest cover of about 70 per cent before 1960, today has only one per cent of the total area in tree cover.¹ 2001 was also the year of the worst droughts in Orissa, with more than 11 million people dying, and the economic loss due to crop damage running into more than 600 crore. The coastal area of Orissa experienced a heat wave in 1998 that killed around 1500 people. The capital Bhubaneswar has a mean temperature of above 40°C — which is comparable to Sambalpur district located in the interior. The year 1999 saw two cyclones hitting the state in quick succession, affecting more than 15 million people, and devastating around 17,000 square kilometre of agricultural land. The state today accounts for 15-22 per cent of malaria cases in the country and 40-50 per cent malaria related deaths.²

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the formation of pollutants like ground-level ozone — the main constituent of smog. Higher temperatures would also increase the evaporation of volatile liquids such as gasoline or organic solvents, again adding to the urban smog problem.³² Children are at higher risk from such increases than adults because their lungs are still developing and they spend more time outdoors in summer when ozone levels are higher.³³ Although uncertainties remain, it is likely that an increase in global temperatures would worsen urban air quality problems by increasing the number of nonattainment areas (areas that do not meet the US Environmental Protection Agency health-based standards), increasing the rate of natural emissions of hydrocarbons, and increasing the formation of acidic material such as sulphates.

Aerosols, particles of a millionth of a centimetre in diameter and consisting of sulphates, soot, organic carbon and mineral dust, affect not only agricultural yield but also exacerbate asthma. The size and toxicity of aerosols and the concentration levels to which people are exposed determines the degree of harm that they cause. Dust particles as large as 10 microgrammes (μg) are known to deposit in the lung airways, causing



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bronchial airway constriction. Particles up to $4 \mu\text{g}$ once inhaled, penetrate into the gas-exchange region of the lungs and hamper the smooth functioning of the lungs. Even particles less than $2.5 \mu\text{g}$ can move past the filtering mechanisms of the lungs, introducing infection directly to the lung tissue.³⁴ According to the Central Pollution Control Board (CPCB), New Delhi, the nearly 42,000 tonnes of invisible pollutants released into the air is responsible for about 2.5 million premature deaths annually in India.³⁵ In China, it is the increased amounts of soot that is responsible for both, the flooding and the increasing droughts in the northern regions.³⁶

Besides asthma, rising levels of carbon dioxide have been found to worsen allergies. Research has shown that ragweed produces significantly more pollen as carbon dioxide increases. The US department of agriculture (USDA) suggests that ragweed pollen production is likely to double over the next century with predicted increases in carbon dioxide levels, causing an increase in allergic reactions.

Mitigating the effects

Climate change is all about sharing of world's resources. Recognising that global warming besides having economic

impacts, also has important health and environmental impacts, it is essential to devise effective measures, which can minimise these enhanced health risks (see box: *Specific adaptation strategies*).

To fight climate change, a shift to renewable energy is required. Wind power today is the fastest growing among alternative sources of energy. Solar energy needs to be promoted so that countries with solar technology can replace the oil producing countries as the biggest suppliers of energy. Shifting to more fuel-efficient vehicles can help arrest vehicular pollution levels thereby bringing down attacks of asthma and other respiratory disorders. Power plants have to work on limiting their emission levels. Sustaining the existing forest cover and planting new trees is another way of slowing global warming. Water has to be protected at the source and illnesses monitored at regular intervals. Besides education and surveillance techniques, improved warning systems will have to be installed and effective disaster management plans laid out.

Allowing climate change to continue means inviting a health holocaust. There is an urgent need to arrest climate change, leave alone revert it. Since the uncertainties in climate change are pervasive, difficult to resolve and large in magnitude they require a coordinated approach to deal with and if that does not happen, people may very well be writing their own epitaph.

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Specific adaptation strategies	
Impact	Adaptation strategy
Extreme weather conditions	Proper urban planning Planning laws Early warning systems
Air quality	Health education Improved public transport systems Stricter emission controls Better traffic planning Timely pollution warnings Carpooling
Vector-borne diseases	Vaccination Usage of impregnated bednets Vector control measures Continuous surveillance strategies Prevention and control programmes Health education Water storage practices Personal hygiene
Water-borne diseases	Water quality regulation Rainwater harvesting Washing hands and personal hygiene Health education Improved sanitation facilities Usage of filters and boiling water

Source: Adapted from IPCC: Third Assessment Report 2001, *Climate change 2001 impacts, adaptation, and vulnerability, Contribution of working group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, p 475.

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Smoky reports

For years, tobacco research has focussed on studying the smoker. Questions regarding the root cause of tobacco caused illness, ie; the tobacco products and the companies who make and promote them have never been raised. Reports from the Pan American Health Organisation (PAHO) and a recent debate in the British Medical Journal (BMJ) bring out the fact that tobacco companies, though intensely competitive, are actually united in campaigns against threats which are common to them.^{1,2} While the PAHO report studied the role of companies like Philip Morris and the British American Tobacco (BAT) in Latin America and Caribbean (LAC) regions, the BMJ documents highlight the role the tobacco industry played in refuting and disclaiming evidence based on a 1981 influential Japanese study.

Ever since scientific evidence in terms of environmental tobacco smoke (ETS) or second hand smoke (SHS) has conclusively linked passive smoking and disease or death, the tobacco industry has tried denying them. Exposure to SHS is known to cause ear infections, bronchitis, pneumonia, asthma, lung cancer, and heart attacks, increase the risk of miscarriage, premature birth and also cause Sudden Infant Death Syndrome in children. In Japan, the 1981 Hirayama spousal study examined the linkages between passive smoking and lung cancer among non-smoking wives of smokers. It concluded that wives of heavy smokers were two times more at a risk of developing lung cancer when compared to wives of non-smokers. The study was influential because of the amount of debate it generated and has been quoted during the setting of regulatory proceedings and risk assessments against the tobacco industry. Several strategies were created by the tobacco industry to actually disclaim and refute such studies. The spousal study was refuted by the tobacco industry which conducted its own independent research. This independent study was done by the Center for Indoor Air Research, Japan, which is supported by the tobacco industry. The study directly refutes claims about SHS causing any health impacts. It says no evidence was found to link SHS to increased risk of lung cancer and disclaims the Hirayama spousal study as having no scientific basis at all. Consultants who took part in the study were all related to the tobacco industry.

The PAO report titled "*Profits over people*" shows similar strategies being carried out in the LAC region. Consultants were commissioned to produce reports that questioned the scientific evidence about passive smoking and ill-health. Symposia were held so that journalists would view the tobacco industry favourably. When it came to advertising, the industry while promoting youth smoking prevention strategies, simultaneously also ran youth targeted cigarette-advertising campaigns, thus adopting a dual marketing policy.

Another interesting paid evidence given out by the consultants was in terms of shifting the debate to indoor air quality. The objective here was to convince the public that SHS was just a minor contributor to indoor air pollution since both indoor and outdoor air already have many other contaminants present.

A total of 40 million people die every year due to tobacco. As the number of deaths continue to rise, it is the developing countries with its ill equipped social infrastructure, which will face this terrible health burden.

These two reports show how human health is of no consequence when it comes to money-making, and how smoking is being termed as a socially acceptable phenomena so that the industry can eventually escape regulatory and legislative constraints.

References:

1. S A Binlous and S Shatenstein 2002, Profit over People — tobacco industry activities to market cigarettes and undermine public health in Latin America and the Caribbean, report of the *Pan American Health Organisation*, November.
2. M Hong and L A Bero 2002, How the tobacco industry responded to an influential study of the health effects of secondhand smoke, in *British Medical Journal*, Vol 325, pp 1413-1416, December.



PRODUCT WATCH



Skin deep

Cosmetics have increasingly been under scrutiny. The latest threat comes from a probable carcinogen and a known endocrine disruptor — phthalate. Three environmental and advocacy groups of the US found that eighty per cent of the 34 cosmetic products tested by them had phthalate. The Environmental Working Group, Coming Clean and Health Care Without Harm conducted the study.

Perfumes, body creams and nail polishes have been found to be laced with phthalates, which is used as a plastic softener and is added to cosmetics, toys, food wraps and paint.

When added to nail polish, phthalates helps them be chip resistant. Phthalates impart flexibility to thin films for mascara. It has the ability to make lotions penetrate deeper into the skin. In perfumes, phthalates keep the fragrance for longer periods. Branded perfumes have been found to contain 28,000 phthalates per million parts. Studies done on animals have demonstrated that phthalates damage the liver, kidneys, lungs, and reproductive system (causing infertility), and also harm the developing fetus.

Whereas exposure of women to phthalates occurs through cosmetics, men have been found to be more vulnerable to the chemicals since they can be absorbed through the skin, inhaled as fumes, or ingested through contaminated food. Exposure of men to phthalates is known to cause atrophy of the testicles (hypospadias), and also damage the prostate gland.

Though alternatives to phthalates are readily available to the industry it is still the first preference for any type of cosmetic or beauty product. Choosing a phthalate-free cosmetic product becomes difficult for the consumer in the absence of any appropriate labelling outside the packaging.

BRIEFS ►

Fat brains

The growing epidemic of obesity in America has different States formulating new healthy policies. More than 60 per cent of American adults and 13 per cent of children and adolescents are obese. Lax policies on fast food, which is usually, junk, high on fat content and almost zero in nutritive value aids the rise in the obesity epidemic sweeping across America. Almost 43 per cent of elementary schools, 74 per cent of middle schools and all high schools have vending machines offering carbonated soft drinks. Fast food like McDonald's is available in more than 20 per cent of schools at all levels. Schools get payoff from the coke companies and the fast food joints in terms of sports uniforms and scoreboards, which helps schools cut down on their education budgets. California in the meantime has banned the sale of soda and junk food in ele-

without providing any sort of health warnings that could be expected on these goods. Informing consumers properly is one of the key issues today in determining better health policies. Biologists are now putting forth the theory that the high sugar content in these fast foods may be triggering a physiological reaction which may be muting the hormonal signals which tell the brain when to stop eating. Leptin, which is continuously secreted by fat cells and whose level in the bloodstream indicates the status of the body's fat reserves, may become resistant in people who eat more of junk food. "The fatter a person becomes the more resistant they will be to the effects of leptin and the harder it is to reverse those effects", says physiologist Luciano Rossetti of the Albert Einstein College of Medicine in New York City, USA. Neurobiologist



AMIT SHANKER/CSE

mentary schools and has limited their sale in middle school. In Tennessee and Wisconsin, it was the parents protests that made school districts refuse to sign contracts with soft-drink vendors.

Worried nutritionists say that it is time that the country redesigns its nutrition policies to improve dietary health. The rate of Type II diabetes in New York City is today 8 per cent, double than what it was in 1994. The increase has been attributed to people who eat much but exercise little. Growing evidence now suggests that fat people are actually victims of the type of food sold in fast-food outlets. These outlets sell hazardous products

Sarah Leibowitz of the Rockefeller University in New York City is of the opinion that early exposures to fatty food can very well reconfigure children's bodies so that they always choose fatty foods. Foods high in sugar content can set up a cycle of instant satiation followed by a plunge in blood sugar, which leads to a natural desire for another snack. Fast food could well turn out to be as addictive as perhaps nicotine and cocaine.

Chlorinated water

C Villanueva *et al* in the study titled: "Meta-analysis of studies on individual consumption of chlorinated drinking

water and bladder cancer" show that long term consumption of chlorinated drinking water is associated with risk of bladder cancer, particularly in men. It was observed that for a vast majority of population of industrialised countries exposed to chlorinated byproducts for long periods, the risks would be higher. In India, the situation is different because of the interplay of economics and public health. Chlorine is used to treat water and in the absence of any disinfection, there would be a high risk of biological diseases. On a risk scale, diseases and fatality due to biological contamination of water is far higher than that of bladder cancer. Chlorine provides what is called as 'residual' disinfection to protect against the biological contamination. This property is not provided by any available substitute like ozone or ultraviolet (UV). Till today, even in the US and Europe, 99 per cent of municipal water is chlorinated. Unless there are other viable alternatives in terms of affordability and easy applicability, chlorine will continue to be used widely.

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Mercury babies

A two-year long study carried out on 1,057 infants by Professor Fok Fai Tai of the department of pediatrics, The Chinese Unit of Hong Kong, has found that a quarter of infants in Hong Kong have excessive mercury in their blood. Excess of mercury is known to cause mental retardation. Pregnant mothers, who consume too much fish, readily pass on the methylmercury into the foetal circulation system. This methylmercury then gets deposited in the foetal brain, and may lead to



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stillbirth, cerebral palsy, mental retardation, speech delay, poor control of chewing, salivation and swallowing.

In as many as 24.7 per cent of the infants, cord blood mercury concentrations were found to be of over 61 nanomol/litre, which is the upper allowable limit. Three per cent had blood mercury concentrations of over 100 nanomol/litre. Says Professor Fok Tai Fai, "Eating too much fish by the mother during pregnancy is the major factor in elevating the blood mercury level of the foetus." It just takes four days for methylmercury to be readily absorbed into the blood after ingestion and to get distributed to all tissues of the body.

In adults, mercury poisoning causes personality changes, nervousness, irritability, fatigue, insomnia, headache, loss of memory, hearing and vision and even renal failure.

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Age and cancer

The US government finally accept that children are more vulnerable to the effects of certain carcinogens than adults. The US Environment Protection Agency's (EPA) draft for new guidelines for cancer risk assessment considers children aged two and younger to have 10 times the cancer risk of adults when exposed to mutagenic carcinogens. These carcinogens such as arsenic, benzene, formaldehyde, mutagen X, brominated organics and polycyclic aromatic hydrocarbons are known to cause cancer through direct damage to the DNA. Children between the ages of 2-15 years have three times the risk of adults.

The guidelines have been updated after 1986. The new guidelines take into consideration not only the amount of dosage exposure of toxic chemical but also considers factors like the time children spend outside and their unique vulnerability with regards to their eating, drinking and breathing in greater proportion to their body weights than adults. For the first time, the risk assessment studies have incorporated elements of both, biology and lifestyle.



PRADIP SAHA / CSE

B O O K R E V I E W

SILENT INVADERS PESTICIDES, LIVELIHOODS AND WOMEN'S HEALTH 2002

Edited by Miriam Jacobs and Barbara Dinham, ZED Books, London, in association with Pesticide Action Network, UK, pp 342.



Beginning with a collation of stories from different countries, which highlight the exposure pattern of pesticides among women, the book illustrates the science of pesticide exposure, explaining the different health hazards like cancer, birth defects, neurotoxic defects and respiratory effects. Keeping the focus on women throughout, it explains the various ways in which the toxicity is manifested. It also talks how under reporting of pesticide hazards and its exposure is common in many countries. What is refreshing in the book is that a global perspective is presented by having different authors speak on what is unique to their country and place in terms of pesticide exposure and health hazards. The book is interspersed with case studies that speak about incidents across the world. A special section is devoted to policy making and regulations, which try to fill in the gap that exists between pesticide policy tools and decision-making procedures.

CAMPAIGN ▶▶

Remembering the forgotten

Remembering those who cannot remember is the underlying motto of the Alzheimer's and Related Disorders Society of India (ARSDI), Delhi Chapter. An incurable, progressive illness, Alzheimer's robs patients of a lifetime of memories. Affecting people above the age of 60 years, its main symptoms are confusion, personality and behaviour changes, loss of the ability to think, reason and remember. Eventually sufferers can no longer recognise friends and relations and are unable to care for themselves.



ARSDI-DELHI

The Delhi chapter of ARSDI was set up in March 1994 by a small group of dedicated workers, with the main objective of establishing a network of societies globally to look into Alzheimers. It is affiliated to the Alzheimer's Disease International (ADI) that has a national office in Kochi and chapters in different parts of India. This non-governmental organisation (NGO) focuses on training the caregivers on how to take care of an Alzheimer patient. Recognising the special needs and care required for Alzheimer's patients, the ARSDI-Delhi has a volunteer system wherein volunteers are trained extensively on providing this special care. Beginning with just one-two volunteers in 1994, the organisation now has 24 volunteers. These volunteers are people who have direct access to the patients in the family. ARSDI-Delhi has linkages with renowned neurologists

of various hospitals in Delhi, to whom the patients are referred for a quick diagnosis. The NGO trains volunteers and the caregivers on the medications needed and maintains a follow up of each patient registered with them. More than 120 Alzheimer's patients are registered with them today.

A Helpline functions from Monday-Saturday 9 a.m. to 6 p.m, providing support and information. The organisation aims to open a support day care centre for the patients in the near future. World Alzheimer's Day, which falls on September 21, is celebrated to take the cause of the patients further and to ensure that the voice of Alzheimer's disease is heard.

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CONCERN ▶▶

Contaminated IV fluids

Nearly 40 per cent of drugs in hospitals are administered through intravenous fluids (IV). Routine quality testing thus gains importance. However, reports of contaminated IV fluids continue. A critical life-saving device, a substandard IV fluid now takes on the role of a cruel life-killer. Until the early 1990's mainly small units manufactured IV fluids, almost forcing this segment of the pharmaceutical industry to adjust with poor quality standards. With health care facilities increasing, the demand and market for IV also increased.

But setting up of huge units and acquiring of latest ISO standards approval does not all the time ensure the best of IV fluids. Sporadic cases of *pseudomonas endotoxin* occurring in the fluids resulting in fatalities in surgery are often reported. Says Anupam Sachdev, pediatric oncologist at the Sir Ganga Ram Hospital, New Delhi, "The hospital purchases the IV fluid in good faith from the company.

Though we on our own do check for contamination based on clarity of the fluid, there is precious little that a doctor can do about microscopic contamination." Harit Chaturvedi, Senior Consultant, Oncology, Apollo



SARVESH

Hospitals, Delhi says that this problem has been around for years. "It is unfortunate," he says, that, "Doctors have so far not come forward to fight this grave menace."

In 1998, the National Human Rights Commission set up an expert

panel to look into the problem of contaminated IV fluids. The interim report states that a few bottles okayed for usage could not be a guarantee for the entire batch. It further added that the companies used world-class Rommelag technique (blow-fill-seal technology) and that contamination could have taken place not at this stage of manufacturing, but during transportation.

Human life has become so cheap that a few deaths during an operation or a camp does not cause any flutter. Contaminated IV fluids though an old problem needs to be addressed as an emerging issue of health concern. It is time doctors got together collectively to ensure safety in health procedures.

*Send in your reactions to:
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Readers write in

For more than five years now, I have been refusing to accept (and use) plastic bags wherever I have been offered one, much to the amusement of people all around. When I was cleaning my college campus as a part of a campaign, I found this plastic bag choking a small plant... the bag had wrapped itself around the plant and the little plant was almost dead... and all around this plant were tiny similar shoots that were beautiful and green. This is what is happening to not just plants, but our planet as well.

Padma T S

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I have just received a copy of your important Nov-Dec issue of the Health & Environment with your editorial & lead articles on Urge Overkill - on spermatology & endocrine disruptors. I suspect that we may have even worse environmental problems here (than in your progressive nation with vigorous opposition to corruption), a legacy of colonial & apartheid & ANC & Corporate cynicism that may be compounding our AIDS & poverty disaster. We are seeking reasons why our "healthy" young men in the Johannesburg area have testosterone levels half of the USA mean, with falling fertility & rampant premature degenerative diseases. I wish the centre all the best in its endeavour to bring into open environmental health concerns.

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The Hesperian Foundation would like to endorse "A Statement of Concern and Call for Action on Plastics and Public Health." CSE has a strong history of working to improve environmental health in India, and the Hesperian Foundation is pleased to join with you on this effort. The Hesperian Foundation recognises the hazards that plastics pose to human health and we strongly support the use of the precautionary principle in all areas relating to human and environmental health. The work of CSE serves as a model for us and for all those who are working on environmental health. We offer our best wishes for your continued success in your work on plastics and all the other important work that you do.

Susan J Quass

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Researches on indoor air pollution and health hazards in women and children. Studying the job exposure and health profile of textile mill workers and comparative health risk assessment in an industrial zone in Chennai.

CSE's Health and Environment Newsletter is a bi-monthly publication and is available online and downloadable at www.cseindia.org/html/healthnews.htm

Other stories related to environment and health are available at our website: <http://www.cseindia.org>
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WATER HEALTH

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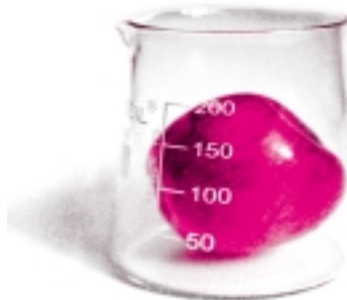
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UNEARTHING REALITY. PREPARING FOR TOMORROW.

An apple a day
may not
keep
the doctor
away



How fresh is a red apple? Don't trust your eyes. It is lined with harmful pesticide residue and heavy metals. And it is not only the apple. Most of our foodstuff and the water we drink are suspect materials for our health.

But we cannot complain or build up any meaningful and informed opinion against it. We are helpless as we lack scientific data.

Centre for Science and Environment, as part of its commitment towards a clean and safe society, has started a state of the art laboratory dedicated to detect deadly pesticide residue and heavy metals in our foodstuff, beverages, water and bloodstream. It also undertakes testing of water for a complete profile of pollutants, even for individuals. We encourage civil society organisations around the country who are into mass movements against pollution to come forward and use this facility to test any "suspect" material.

CSE POLLUTION MONITORING LABORATORY

For details, contact:
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