

# There's less time than we're counting on

MD. ASADULLAH KHAN

PRESIDENT George Bush's refusal to cutback emission of greenhouse gases in the United States in keeping with the Kyoto and Montreal protocols has come as a shock to all nations in the world supporting green movement. Incidentally the stand taken by the newly elected US president has side-tracked his immediate predecessor Bill Clinton's vow in 1997 at a White House conference on climate change that the US must give leadership to the fight against global warming to save our children and grandchildren from catastrophe. Australia, Brazil and Canada are also going away from the legally binding targets for reducing greenhouse gases namely, carbon dioxide, methane and nitrous oxide. Australian Prime Minister John Howard has said that his country would walk away from an international treaty rather than sacrifice jobs or economic growth. Once considered a green leader in the international field, Canada is now proposing a "harmonisation" strategy. This means the federal government is pushing its environmental responsibilities to individual provinces, which are then drastically slashing the environmental budgets. Now, only the European Union and Japan seem to be willing to adhere to the binding goals.

Despite the fact that greenhouse gases pose serious harm to humans, even then it is true that without these the world have been much too cold for comfort, unable to sustain life as we know it. But the problem is that humans are producing a lot of greenhouse gases by burning fossil fuels. The preponderance of scientific thought today sees the next 100 years as a time of traumatic environmental change. The United Nations Intergovernmental Panel on Climate Change (IPCC) projects a rise in average global temperature of about 1-3.5 degrees Celsius by the year 2100. The report further says that warming in this range is cause for concern, if not alarm. And this pattern of warming - more in the arctic than near the equator, more in the night than the day, more in winter than summer - fits that predicted by supercomputer models of man-made climate change better than it does natural climate variability. Such findings spurred the United Nations Intergovernmental Panel on Climate Change - some 2500 scientists from academia, environmental groups, industry and government - to conclude in 1996 that man-made warming has already been discerned.

Gases such as carbon dioxide (from deforestation and the burning of coal, oil and natural gas) act like little panes of glass in a greenhouse. With nations pouring at least seven billion tonnes of carbon into the atmosphere every year, there is 30 per cent more carbon dioxide in the air today than in 1860. Scientists' findings come through analysing pockets of air trapped in ice cores. Then they determine the age of the core by counting layers of ice deposition, much like counting tree rings. So much warming is built into the atmosphere already that the planet will heat up another half degree in the next 20 years. For that reason, 160 nations that met in Kyoto, Japan in 1997 tried to reach some kind of agreement on what to do about greenhouse emissions. But that agreement seems to have been foiled by the affluent nations, mainly the US, which produce 25 per cent emissions with only four percent of world population.

Scientific modelling produced by some of the world's most advanced supercomputers has depicted a series of scenarios that might result from global warming. The current boundaries of year round farming are pushed further to the north and south as temperatures moderate. But the lands today considered breadbaskets of the world are left with reduced crop yields. That's because moisture in the soil evaporates at higher rates as the overall temperature rises and soil moisture is a key to plant growth. So more rain should be falling somewhere, but it is unlikely to make up for the lost moisture in what had been the planet's most fertile fields. The deserts found in the mid-latitudes are also expected to expand, even as regions of arable land move north and south. The growth of desert areas can already be observed in North Africa's Sahara. Because of all these situations, habitats for some animals have started shrinking and range of insects are expanding. In the backdrop of all these scenarios, the alarming predictions of the World Health Organisation that malaria and dengue fever



The more the murkier... as the industrialised nations keep spewing poison in the air, it's the poor and developing ones that would suffer.

could reach epidemic levels and spread further from the equator as a result of warmer climate has come true. Bangladesh, which hardly knew about dengue fever in the past, has now fallen victim to this deadly fever with increasing frequency.

The impact of warming on water and water bodies are much more severe. Rising waters, the result of melting polar icecaps and water expansion from increasing warmth are the most widely anticipated consequence of a warming world. The UN's IPCC projects that the world's oceans will rise anywhere from 15 to 95 centimetres by the year 2100. This may not sound like much but figures at the high end of that scale would rob a low-lying nation like Bangladesh of over 20 per cent of its arable land. And in the US it could put the city of New Orleans and Florida Keys under water. The worst has already started playing out: seas have risen by almost 10 inches or 25 centimetres this century, and more thermal expansion of seawater and glacier melting will push oceans up even further. IPCC calculation: 23 inches by 2100, half that by 2050. The resulting scenario: the US could lose 10,000 square miles of coastland with a two-foot sea-level rise. Even at the low end of the scale mentioned above rising waters would increase coastal erosion and heighten the damaging effects of hurricanes and coastal storms. Encroaching salt water has the potential to contaminate water supplies that coastal cities and farms depend on. The rising ocean finds it easier to make its way inland as the level of coastal rivers and streams drop. Leaving aside the outright loss of land to the ocean, the threat of contaminated water supplies is perhaps the most serious problem posed by rising sea levels. And in a warmer world, suspects climatologist Kevin Trenberth of the National Centre for Atmospheric Research, El Nino with all its attendant hazards and fury will be more common. If the world warms by even a few degrees, tropical diseases as mentioned earlier, could follow the rising mercury. And if the world warms five to nine degrees, estimates the IPCC, 60 per cent of the population will live in the malaria zone. One good omen of a warmer climate is that in a world richer in carbon dioxide which plants breathe in, crops should grow faster. The IPCC optimistically notes that, "on the whole, global agricultural production could be maintained if carbon dioxide levels in the atmosphere doubled but regional effects would vary widely. But warmth that is good for crops is also good for crop pests. A longer growing season could for example, enable grasshoppers to squeeze in another

round of reproduction. Weeds and crop diseases will also thrive in a warmer world where fewer regions experience harsh winters that keep pest populations in check. "All indications are that pests and diseases like rusts and molds will increase," says Linda Mearns of NCAR.

Inevitably, the adverse effect of climate change in areas like Bangladesh is grimmer. Research reports made public by the SAARC scientists body in February last indicates that 36,000 sq-km in Bangladesh out of 1,47,570 sq km faces an uncertain and grim future. This includes the Sunderbans, the biggest mangrove forest in the world, and the longest sea beach in Cox's Bazar. About 14,000 sq-km in the Coastal Zone is just one metre above the sea level. This means sea levels will rise obliterating the vast areas comprising Khulna, Bagerhat, Pirojpur, Bhola, Barguna, Jhalkhati, Lakshmipur, Noakhali and Chittagong with harrowing consequences. If this trend continue, it will wreak havoc on our economy because of increased saline intrusion on the existing farmland and the number of environmental refugees will increase. The report by an expert committee further estimates that such an adverse situation will bring about a GDP loss of 13 per cent with consequential increase in ailments, mainly water borne diseases. And this disastrous climatic changes for the country could cost the economy to the tune of 45,000 crore taka. Because of the rise of sea levels, heat waves, drought, floods, water logging and hurricanes may be previews of what could happen with ever increasing frequency. And the deaths caused by cyclone in Bangladesh has till now been almost 53 per cent of the total deaths in such related events in the world because of poor infrastructure, lack of communication facilities and a tremendously poor rescue efforts.

This makes it abundantly clear for the industrialised and affluent nations to set national or regional limits to the release of carbon dioxide, the chief suspect in any global warming that might be going on. Carbon dioxide is a greenhouse gas, which means that it helps to trap heat in the atmosphere. More carbon dioxide would, on the face of it, mean a hotter earth and that might lead to the consequences feared by IPCC panel. But carbon dioxide is also an inevitable by product of burning the fuels - coal, oil and natural gas - that make an industrial way of life possible. The result of cutting its production could therefore be profound. People in rich countries might have to change their comfortable existences in order to consume less energy. Those in countries trying

to become rich might see their own aspirations to such comforts confounded or at least delayed.

Ever since the Kyoto agreement came in, US industries and think-tanks churned out papers like "Kyoto Madness" and warned that greenhouse gas limits would suck US\$350 billion out of the economy every year, boost electricity costs by 52 percent, bring gasoline rationing, force poorer families to restrict their recreational activities and eliminate 600,000 jobs. The other side counters that reducing emissions by 2010 to 10 per cent below 1990 levels would save the average household US\$530 a year in energy bills and generate 773,000 new jobs.

But the reality is: gases such as water vapour and carbon dioxide trap infrared radiation warming the world. Water vapour accounts for some 98 per cent of the warming without which the Earth would be 61 degrees Fahrenheit colder. Carbon dioxide accounts for much of the other two per cent, the vast majority of that comes from burning fossil fuels (coal, oil and natural gas). But fiddling with that two per cent is like pushing on a long lever: a tiny push can bring huge changes. The concentration of carbon dioxide in the atmosphere has risen from 280 parts per million (ppm) before the Industrial Revolution to 360ppm in the next century. And the world has already warned about one degree Fahrenheit over the last century. And because seawater expands when heated, oceans have risen four to ten inches. Surely, this is not a natural climate swing. Sure enough, over the last 10,000 years variability has seldom been this high.

Despite the fact that the developed nations in the Earth Summit held in Rio de Janeiro in 1992 and Kyoto Protocol in 1997 pledged to cut their releases of greenhouse gases so that emissions in the year 2000 would not exceed 1990's, things hardly worked that way. About the countries that have a chance of living up to its promise are Sweden, Japan and European Union. The United States is relying on industry to voluntarily reduce emissions - by using less energy and making more fuel-efficient cars, for instance. Rather than adopting tough measures like an energy tax, which would cut energy use but also end political careers, the US and other countries are hoping that technology will ride to the rescue. Maybe, solar power and hydrogen will replace coal and oil before greenhouse warming gets bothersome. But there's less time than the governments are counting on.

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## ENVIRONMENT WATCH

### High and dry

*A billion Asians could be parched in 24 years*

**AFP, Honolulu, Hawaii**

A billion Asians risk being stranded high and dry as the global supply of fresh water recedes amid urbanisation, a growing population and cross-border supply conflicts, experts said on May 8.

Even "relatively privileged countries such as the United States and Canada" are not going to be trouble-free over the next 50 years, said Harvard University environmental engineering professor Peter Rogers.

"International conflicts over water are likely to consume more and more of our time," he told an international symposium on the sidelines of the Asian Development Bank (ADB) annual meeting in Hawaii.

Rogers said the World Trade Organisation "is likely to infringe more and more upon sovereign powers of nations' regulation of water quality, stoking trade wars and other conflicts."

The supply crunch could also revive old - and introduce new - water-borne diseases and lead to micro-pollutants from pharmaceuticals such as synthetic hormones getting through existing treatment facilities, he added.

Ainun Nishat, Bangladesh's country representative to the World Conservation Union (IUCN), said, "If all the earth's water fit in a gallon jug, available fresh water would equal just over a tablespoon - about three-fourth of one per cent of the total," he told the symposium.

"The earth has virtually this same amount today as it did when dinosaurs roamed the planet," Nishat said.

Peter Gleick, of the Oakland, California based Pacific Institute for Studies in Development, Environment and Security, said, "Nearly three billion people live without access to adequate sanitation systems necessary to reduce exposure to water-related diseases."

The 21st century dawned with "more than a billion people in the developing world lacking safe drinking water," he added.

Rogers said most countries now have regulations "to maintain sustainable flows of higher quality," but wondered whether these could withstand possible pressure amid an economic backlash.

"One-third of the world's population is living in countries experiencing medium water stress," Rogers said.

"Asia has the lowest per capita availability of water, and by the year 2025 nearly one billion people in Asia will not have adequate access to water."

He said the explosion of urban populations as well as migration in the developing world would more than double the 1.7 billion people now poorly supplied with water and sanitation services.

In the next half century the global population should grow until it stabilises at around 9.3 billion, Rogers said.

He said high estimates for water use for the period "are becoming uncomfortably close to the estimated 13,700 cubic kilometres of potentially easily available water."

"Unfortunately, it looks as though the bulk of the developing countries will spend the next 50 years struggling to provide safe drinking water and sanitation to their burgeoning urban populations and enough irrigation water to maintain the high levels of food production needed to provide improving diets," he added.

During that period, "it is not expected that they will be able to restore and maintain their already damaged aquatic ecosystems."

Rogers noted that even in water-endowed North America, "international issues between the US and its neighbours are becoming increasingly tense with respect to water pollution and water withdrawals."

In Indonesia, the world's fourth most populous nation, "issues of water resources management are increasingly important on Java and other islands," said Minister of Settlements Erna Witoealar.

With 60 per cent of the country's population, Java's problems are overpopulation, water degradation and depletion, while in outlying islands there is also "degradation due to widespread deforestation and improper open-mining practices and newly opened plantations on the watersheds."

He said, "Unless effectively addressed, it will increasingly constrain the country's economic development and food security."

Nishat of IUCN said South Asia's river systems should provide enough water to meet present and future demand, but that "distributing the water in proper time in proper amount or flow adjustment will be the prime issue of concern."

He said dams "have been built from the nationalistic point of view." Bangladesh's drinking water, derived from ground water, "has been contaminated by arsenic", while water logging and secondary salinity are the major problems in Pakistan, he added.

# Vanishing before our eyes

EDWARD O WILSON

KNOWN as the biosphere to scientists and as the creation to theologians, all of life together consists of a membrane around earth so thin that it cannot be seen edgewise from a satellite yet so prodigiously diverse that only a tiny fraction of species have been discovered and named. The products of billions of years of evolution, organisms occupy virtually every square centimetre of the planet's surfaces and fill nearly every imaginable niche.

Biologists estimate that more than half the species occur in the tropical rainforests. From these natural greenhouses, many world records of bio-diversity have been reported - 425 kinds of trees in 2.5 acres (one hectare) of Brazil's Atlantic forest and 1,300 butterfly species from a corner of Peru's Manu National Park, both more than 10 times the number from comparable sites in Europe and North America. At the other extreme, the McMurdo Dry Valley's of Antarctica, with the poorest and coldest soils in the world, still harbour sparse communities of bacteria, fungi and microscopic invertebrate animals.

A few remarkable species, the "extremophiles," have achieved astonishing feats of physiological adaptation at the ends of habitable Earth. In most frigid polar waters, fish and other animals flourish, their blood kept fluid by biochemical antifreezes. Populations of bacteria live in the spumes of volcanic thermal vents on the ocean floor, multiplying in water above the boiling point. And far beneath Earth's surface, to a depth of two miles (3.2km) or more, dwell the SLIMES (subsurface lithoautotrophic microbial ecosystems), unique assemblages of bacteria and fungi that occupy pores in the interlocking mineral grains of igneous rock and derive their energy from inorganic chemicals. The SLIMES are independent of the world above, so even if all of it were burned to a cinder, they would carry on and, given enough time, probably evolve new life-forms able to re-enter the world of air and sunlight.

Earth's bio-diversity (short for biological diversity) is organised into three levels. At the top are the ecosystems, such as rain forests, coral reefs and lakes. Next down are the species that compose the ecosystems: swallowtail butterflies, moray eels, people. At the bottom are the variety of genes making up the heredity of each species. How much bio-diversity is there? Biologists have described a total of between 1.5 million and 1.8 million species. Yet this impressive achievement is only a small beginning. Estimates of the true number of living species range, according to the method employed, from 3.6 million to more than 100 million.

Least known are the smallest organisms. By

repeated sampling, biologists estimate that as few as 10 per cent of the different kinds of insects, nematode worms and fungi have been discovered. For bacteria and other micro-organisms, the number could be well below one per cent. Even the largest and most intensively studied organisms are incompletely catalogued. Four species of mammals, for example, have recently been discovered in the remote Annamite Mountains along the Vietnam-Laos border. One of them, the saola or spindlehorn, is a large cow-like animal distinct enough to be classified in a genus of its own. Earth, as far as life is concerned, is still a little-known planet.

Biologists who explore bio-diversity see it vanishing before their eyes. To use two of their favourite phrases, they live in a world of wounds and practise a scientific discipline with a deadline. They generally agree that the rate of species extinction is now 100 to 1,000 times as great as it was before the coming of humanity. Throughout most of geological time, individual species and their immediate descendants lived an average of about one million years. They disappeared naturally at the rate of about one species per million per year, and newly evolved species replaced them at the same rate, maintaining a rough equilibrium. No longer. Not only has the extinction rate soared, but also the birth rate of new species has declined as the natural environment is destroyed.

The principal cause of both extinction and the slowing of evolution is the degrading and destruction of habitats by human action. While covering only six per cent of Earth's land surface, about the same as the 48 contiguous United States, the rain forests are losing an area about half the size of Florida each year. Damage to intact forests, which occurs when they are broken up into isolated patches or partly logged, or when fires are set, threatens bio-diversity still more. With other rich environments under similar assault, including coral reefs (two-thirds degraded) and salt marshes and mangrove swamps (half eliminated or radically altered), the extinction rate of species and races is everywhere rising.

Not all doomed species disappear immediately. Most first suffer loss of their ranges and gene pool to dangerously low level, eventually descending to join what biologists call the "living dead." Throughout the world, 976 tree species, for example, are classified as critically endangered. Two are down to three or four surviving individuals and three others to only one. I have been grimly compiling what I call the Hundred Heart Club of animal species - those consisting of a hundred of fewer individuals, hence that number of heartbeats away from total extinction. The club's familiar members include the Javan rhinoceros, Philippine eagle, Hawaiian crow, Spix's macaw and Chinese river dolphin. Other endan-



Dry forest in Mexico... one of the ten vulnerable eco-regions in the world

gered species lined up for early admission are the giant panda, Sumatran rhinoceros and mountain gorilla.

Palaeontologists recognise six previous mass-extinction events during the past half-billion years (the number was until recently believed to be five, but now another, from early Cambrian times, has been added). The last and most famous, which occurred 65 million years ago and was caused by a giant meteorite strike off the presentday coast of Yucatan, ended the age

of dinosaurs. These catastrophes followed a typical sequence. First, a large part of bio-diversity was destroyed. There was a bloom of a small number of "disaster species," such as medleys of fungi and ferns that survived and reproduced rapidly to fill the habitable spaces emptied of other life. As more time passed, a few "Lazarus species" reappeared in localities from which they had been wiped out, having been able to spread from isolated pockets difficult to detect. Then, very slowly, across two million to five million

or more years, life as a whole evolved again to its full, original variety.

Researchers of bio-diversity agree that we are in the midst of the seventh mass extinction. Even if the current rate of habitat destruction were to continue in forests and coral reefs alone, half the species of plants and animals would be gone by the end of the 21st century. Our descendants would inherit a biologically impoverished and homogenised world. Not only would there be many fewer life forms, but also faunas and floras would look much the same over large parts of world, with disaster species such as fire ants and house mice widely spread. Humanity would then have to wait millions of years for natural evolution to replace what was lost in a single century.

In the long term, I am convinced, the quenching of life's exuberance will be more consequential to humanity than all of present day global warming, ozone depletion and pollution combined. Why? For practical reasons, if nothing else. Humanity's food supply comes from a dangerously narrow siver of bio-diversity. Throughout history, people have cultivated or gathered 7,000 plant species for food. Today only 20 species provide 90 per cent of the world's food and three - maize, wheat and rice - supply more than half. Tens of thousands of species of the world's still surviving flora can be bread or provide genes to increase production in deserts, saline flats and other marginal habitats.

Natural pharmaceuticals offered by bio-diversity are also under-utilised. Only a few hundred wild species have served to stock our antibiotics, anticancer agents, painkillers and blood thinner. The biochemistry of the vast majority - millions - of other species is an unfathomed reservoir of new and potentially more effective substances. The reason is to be found in the principles of evolutionary biology. Caught in an endless arms race, these species have devised myriad ways to combat microbes and cancer-causing runaway cells. We have scarcely begun to consult them for the experience stored in their genes.

If the future enhancement of agriculture and medicine is not thought enough to merit conservation, then consider survival. The biosphere gives us renewed soils, energy, clean water and the very air we breathe, all free of charge. The more species that compose wild communities, the more stable and resilient becomes the planet as a whole.

Then consider ethics. More and more leaders of science and religion now pose this question: who are we to destroy or even diminish bio-diversity and thus the creation? Look more closely at nature, they say; every species is a masterpiece, exquisitely adapted to the particular environment in which it has survived for thou-

sands to millions of years. It is part of the world part of Eden if you prefer - in which our own species arose.

The profligacy of the 20th century has led humanity into a bottleneck of overpopulation and shrinking natural resources. Through this bottleneck humanity and the rest of life must now pass. By the end of century, if we are both lucky and wise, we will exit in better shape than we entered, with the population peaked around 8 thousand million or less and a gradual decline begun. People everywhere will have acquired a decent quality of life, with the expectation of more improvement to come. One of the defining goals of the century must also be to settle humanity down before we wreck the planet. To that end it is important to accept the challenge and responsibility of global conservation - and to do so right now, before it is too late. We will be judged by the amount of bio-diversity we carry through the bottleneck with us.

There are reasons to be warily optimistic that bio-diversity may be salvageable. Whether it happens in time depends fundamentally on the shift to a new ethic, which sees humanity as part of the biosphere and its faithful steward, not just the resident master and economic maximiser. That change of heart has begun in most countries among a few farsighted leaders and a growing part of the general public, albeit very slowly.

Success also depends on attention to sustainable management of the environment, including protection of bio-diversity. Conservation experts now give top priority to "hot spots," pockets of wild nature that contain high concentrations of species, which give hope that a great deal can be accomplished in a short span of time. From the coastal sage of California to the rainforests of West Africa, the hottest of the terrestrial hot spots occupy only 1.4 per cent of the world's land surfaced yet are the exclusives home of more than a third of the terrestrial plant and vertebrate species. Similarly, from the streams of Appalachia to the Philippine coral reefs, aquatic hot spots occupy a tiny fraction of the shallow water surface. This much of the world can be set aside quickly without crippling economic or social consequences. More difficult but equally important are the preservation and long-term non-destructive use of the remaining fragments of the old-growth forests, including the tropical wildernesses of Asia, Central Africa and Latin America.

None of this will be easy, but no great goal ever was. Surely nothing can be more important than to secure the future of the rest of life and thereby to safeguard our own.

**-USIA feature**

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