

The Crisis of Global Warming

Mankind's Survival at Stake



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The Crisis of Global Warming

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From this booklet...

"We have at most ten years - not ten years to decide upon action, but ten years to alter fundamentally the trajectory of global greenhouse emissions".

*James Hansen, one of the world's foremost climatologists,
and chief of NASA's Goddard Institute for Space Studies*

"We are crossing natural thresholds that we cannot see and violating deadlines that we do not recognize. Nature is the time keeper, but we cannot see the clock....We are in a race between tipping points in the earth's natural systems and those in the world's political systems. Which will tip first?"

Lester Brown, Plan B 3.0

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The Unprecedented Crisis of Global Warming

Neeraj Jain

Global warming is the increase in the average temperature of the Earth's near-surface air and oceans since the mid-twentieth century and its projected continuation.

Some scientists dispute the existence of global warming, others believe that while global warming is taking place, it is occurring naturally, in other words, the contribution of human beings to global warming is negligible. But the fourth assessment report of the United Nations Intergovernmental Panel on Climate Change (IPCC) released in 2007, *Climate Change 2007: The Physical Science Basis* has virtually ended this debate. This report was the product of the combined efforts of hundreds of scientists (150 lead authors with 450 contributing authors) from all over the world, and had to be unanimously approved by 154 governments, including the United States and other major oil-producing countries. The IPCC 2007 report confirms that the warming of the Earth's atmosphere is "unequivocal", and that human activities are the cause. It goes on to warn that under current economic and social trends, global warming is not only going to continue, its rate is going to increase in the coming decades, and that this is putting the world on a path to unprecedented ecological catastrophes.¹ As the IPCC report was being released, new evidence emerged suggesting that climate change is taking place at a much faster pace than is suggested by the IPCC report and that the potential consequences are likely to be far more dreadful.

Before we take a look at the evidence regarding the seriousness of the global warming crisis and its likely impact on life on Earth, let us first go to the basics of global warming as to why it is taking place.

Rising levels of CO₂ in the atmosphere

The Earth's atmosphere is transparent to the visible light coming from the sun, that is, it passes through the Earth's atmosphere to strike the Earth's surface. The surface of the Earth re-radiates it back to space in the form of infrared light. The Earth's atmosphere contains greenhouse gases, which are transparent to visible light, but opaque to infrared light. They absorb the infrared light radiated from the Earth's surface, trapping the thermal energy and thus warming the Earth. This is known as greenhouse effect. The primary greenhouse gases are water vapor, carbon dioxide (CO₂), and methane (natural gas, CH₄).

The greenhouse effect is one of Earth's natural processes and is essential for life on Earth. Without a natural greenhouse effect, the temperature of the Earth would be about -18°C instead of its present +14°C! Therefore, a certain amount of global warming occurs naturally, and the natural effect is not small – the naturally occurring greenhouse gases cause a mean temperature rise of about 33°C!

So, the concern is not whether greenhouse effect exists or not, that is undisputed, but the extent to which human activities are leading to its enhancement by the emission of greenhouse gases. It is this additional global warming that is threatening the existence of life on Earth.

Ever since the industrial revolution began, human activity has been increasing the concentration of greenhouse gases in the atmosphere (primarily due to build up of CO₂ in the atmosphere due to the burning of fossil fuels – coal, oil, and natural gas – and deforestation). Scientists have estimated the levels of CO₂ and other greenhouse gases in the atmosphere for the last many thousand years by examining air bubbles trapped in ice in Antarctica and Greenland. Their experiments show that for 10,000 years before the start of the Industrial Revolution, the level of CO₂ in the atmosphere remained stable at about 280 parts per million (ppm); since then, it has steadily increased and was 387 ppm in 2008 – an increase of 38% above pre-industrial levels.²

The global concentration of CO₂ in our atmosphere today far exceeds even the natural range over the last 650,000 years of 180 to 300 ppm! According to the IPCC Special Report on Emission Scenarios (SRES), by the end of the 21st century, we could expect to see carbon dioxide concentrations of anywhere from 490 to 1260 ppm (75-350% above the pre-industrial concentration)!!³

The consequences

What concerns us, as ordinary citizens of planet Earth, is: what will be the effect of increased greenhouse gases on life on our planet? For this, it is important to know what will be the effect of increased greenhouse gases on global temperature. That is not such an easy question to answer.

To take an example, a very simple calculation from a standard physics textbook shows that (if you make the assumption that nothing else in the system changes) a doubling of CO₂ from the pre-industrial levels is estimated to produce a temperature rise of about 1.2 to 1.3°C.

This increase of 1.2 to 1.3°C only takes into account the direct atmospheric warming due to the enhanced greenhouse effect of the

doubling of CO₂ in the atmosphere. It does not take into account any changes in the system – it may so happen that this rise in temperature may impact the Earth in such a way that it would affect the concentration of CO₂ in the atmosphere, which would in turn then affect the temperature rise. The real challenge before climate science is estimating the effect of changes in the system on the changes in the temperature. These changes are called “feedback”.

If the feedback is positive, then changes in the Earth will enhance the change in temperature, and global warming arising from a doubling of pre-industrial CO₂ will be more than 1.2 to 1.3°C. If the feedback is negative, then changes in the Earth will counteract the change in temperature, and global warming from a doubling of pre-industrial CO₂ will be less than this 1.2 to 1.3°C.

An important example of positive feedback is the ice-albedo effect. If the temperature increases, ice and snow melt near the poles, replacing white snow with dark Earth. Since snow reflects sunlight while Earth absorbs sunlight, this decreases the reflectance (“albedo”) of the Earth. Decreased reflectance means that a larger fraction of the sunlight falling on Earth is absorbed. This in turn leads to further warming. Thus a small warming leads to larger warming.

The challenge before climate scientists is to estimate the feedback due to the rise in greenhouse gases in the atmosphere. The number of possible feedbacks is quite complex. Till some time ago, climate scientists were debating this question. But now, nature has decided to intervene to settle this debate.

Human civilization under threat

The world is currently about 0.8°C warmer than pre-industrial times. The IPCC report, a collaborative report by hundreds of scientists, says there’s little doubt that the Earth will be a much hotter place than today by the end of the century. It projects a further increase of 1.8 to 4.0°C in global average temperature during this century. Based on this estimate, the panel predicts a sea level rise of about a half a meter, or roughly 45 centimeters, by the end of this century.

However, a number of leading climatologists dispute the IPCC report as too conservative. In an article in *Science* (January 19, 2007), Stefan Rahmstorf, Professor of Physics of the Oceans at Potsdam University, estimated the rise in future sea levels based on a study of rise in sea levels in the 20th century due to global temperature rise. Using this, he

projected that the IPCC estimations of temperature rise over the next century would lead to a “sea-level rise in 2100 of 0.5 to 1.4 meters above the 1990 level.”⁴

James Hansen, Director of the NASA Goddard Institute for Space Studies and widely considered to be the world’s foremost climatologist, in an interview to the weekly environmental news program *Living on Earth* aired on February 2, 2007, also made the same point, that the IPCC has hugely underestimated the impact of global temperature changes on rise in sea levels. As the ocean warms due to increasing global temperature, it also expands, causing the sea level to rise. But the actual rise in sea levels is much more than this. That is because rise in global temperatures also leads to melting of glaciers as well as melting of ice sheets – these will lead to a further rise in sea levels. Hansen argued that the IPCC does not take into account the rise in sea levels due to melting ice sheets; global warming is causing destabilization of the ice sheets in Greenland and Antarctica, and this would result in big increases in sea levels – to be measured in meters rather than centimeters. Nonetheless, the new IPCC report estimates an increase in sea level of only 18 to 60 centimeters this century. He pointed out that this estimate is even lower than the estimate made by the IPCC in its third assessment report of 2001!⁵

As the temperature increases, a chain reaction is set in motion, amplifying warming tendencies. The ice caps melt and pools of water are formed. Rather than reflecting solar radiation, like the white ice does, the blue water absorbs the heat, further accelerating the rate of melting of the adjacent ice cap. This water also heats the ice below, drilling deep holes of warm water within an ice shelf. These narrow, tubular holes, known as moulins, can sink to many meters deep and can ultimately reach the base of the ice shelf. When this tunnel of warm water reaches the land beneath the ice, it serves as a lubricant that can get the ice sheet to start moving and ultimately make it fall into the sea. This would lead to a huge rise in sea levels. For instance, the melting of just Greenland’s ice sheet could raise the worldwide sea level 6 meters. These positive feedback loops can start out slow, but accelerate in time.⁶

A warning that this is beginning to happen was given in 2006 itself by Richard A. Kerr in the March 24, 2006, issue of *Science*. Kerr gave evidence to show that the melting of ice sheets and glaciers in Greenland and Antarctica has accelerated in the last ten years. Ice shelves are moving rapidly towards the sea and melting. For example, when the

1,255-square-mile Larsen B ice shelf broke off of Antarctica in 2002, it only took 35 days for it to disappear.⁷

“If you start talking of (global temperature rises of) two or three degrees Celsius”, James Hansen points out, then taking into account such changes, “you’re really talking about a different planet from the one we know”.⁸

Heading into an irreversible crisis

All that was in 2006 and early 2007. Then came another piece of news, which showed that all these projections are gross underestimates. Even as the IPCC report was being released, in September 2007 research data revealed that the floating sea-ice in the polar north was disintegrating at a frightening speed and that the **Arctic Ocean could become ice free in summertime possibly as soon as 2013, about one century ahead of what is predicted by the IPCC models**. With the complete melting of the Arctic summer sea ice, the disintegration of the Greenland ice sheets may become unavoidable, threatening to **raise the sea level by five meters or more within this century**. About half of the world’s fifty largest cities are at risk and hundreds of millions of people will become environmental refugees.⁹

Till some time ago, Hansen, the United States’ most eminent climate scientist, had argued that to avoid a devastating rise in sea levels, the world should aim to limit further global warming to no more than 1°C relative to 2000. According to the existing IPCC models, this implies that the world should aim at restricting the rise in atmospheric concentration of CO₂ to no more than 450 ppm as compared to the present 387 ppm.¹⁰

However, by the end of 2007, Hansen had drastically upped his estimates of the danger. In December 2007, Hansen told a major international gathering of 15,000 global warming experts in San Francisco that climate tipping points have already been passed for large ice sheet and species loss. He stated that this had occurred at least two decades ago, when CO₂ levels in the atmosphere had crossed 350 parts per million (the current level is 387 ppm). Hansen said there is already enough carbon in the Earth’s atmosphere for massive ice sheets such as Greenland to eventually melt away and ensure that sea levels will rise many meters this century. People must therefore not only cut current carbon emissions, but also remove some carbon that has collected in the atmosphere since the Industrial Revolution in order to cool the planet. He concluded: “If humanity wishes to preserve a planet similar to that on which civilization

developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm.”¹¹

Clearly, the very survival of human civilization is at stake. There is probably no well-informed climate scientist who thinks that it is possible to avoid dangerous climate change with the permanent loss of the Arctic summer sea-ice. To get back Arctic sea ice, we need to not only stop global warming and move to zero greenhouse gas emissions as fast as the economy can be restructured, we actually need to reduce the amount of carbon dioxide in the atmosphere. If we don’t, we cannot avoid very dangerous climate impacts. There is no third way.

We don’t have much time left!

According to James Hansen, one of the world’s foremost climatologists, we have less than a decade to get our act into motion: “We have at most ten years – not ten years to decide upon action, but ten years to alter fundamentally the trajectory of global greenhouse emissions”.¹² In other words, nature has declared, ‘Enough is enough’. Unless we move fast to rectify the damage done to nature, nature is bent upon setting into motion irreversible processes which could create entirely new ecological conditions threatening the very existence of human civilisation. This includes not just the sharp rise in sea levels of the order of many meters, but also other results of global warming not discussed in this article – drought, flooding, hurricanes, extinction of species and loss of biodiversity, etc.

Furthermore, while global warming is indeed a crisis of earth-shaking proportions, it is only one part of what we call the global environmental crisis! The global ecological threat as a whole is made up of a large number of interrelated crises and problems that are confronting us simultaneously. Here is a brief list as drawn up by John Bellamy Foster, one of the world’s leading social scientists and the editor of the renowned US journal *Monthly Review*:

Destruction of the ozone layer, extinction of species, loss of genetic diversity, acid rain, nuclear contamination, deforestation, wetland destruction, soil erosion, desertification, floods, famine, the despoliation of lakes, streams, and rivers, the depletion and contamination of ground water, the pollution of coastal waters and estuaries, the destruction of coral reefs, overfishing, expanding landfills, toxic wastes, the poisonous

effects of insecticides and herbicides, urban congestion, and the depletion of nonrenewable resources.

Not just global warming, but many of these ecological problems also are becoming very severe; the planetary ecological crisis is increasingly becoming all-encompassing.

The scale of ecological destruction caused the Bulletin of Atomic Scientists recently to move its symbolic “doomsday clock” to five minutes to midnight, two minutes forward from where it was – and twelve minutes closer to cataclysm than in the early 1990s.¹³

There are no shortcuts!!

The most commonly offered solutions to the crisis of global warming are: better gas mileage and better emissions standards, the introduction of hydrogen-powered cars, the capture and sequestration of carbon dioxide emitted in the atmosphere, improved conservation, and voluntary cutbacks in consumption. At the policy level, suggestions being given include green taxes, green technologies, tradable pollution permits, and so on.

However, the global environmental crisis is so acute that these solutions just touch at the fringes; much more radical steps need to be taken if we are to prevent climate change from crossing thresholds beyond which it will spin out of human control. But the developed capitalist countries as well as the biggest third world countries like India and China are refusing to implement the more radical solutions. On the contrary, they continue to behave as if the global warming crisis does not exist. To give two recent examples:

1. Ten years after the first Earth summit was held in Rio in 1992, the second Earth summit, the World Summit on Sustainable Development, convened in Johannesburg in 2002. These summits represented the hope that finally humanity was coming together to address the global ecological crisis. But by the time of the second summit, these hopes had dissipated. Not only did the US, the world’s biggest emitter of greenhouse gases, refuse to sign the Kyoto protocol, President Bush also declined to attend the Earth summit. On top of it, cocking a snook at those debating the heating up of the world due to consumption of fossil fuels in Johannesburg, the US also began preparing to invade Iraq to seize control of its oil resources. But the record of the other major polluters who did sign the Kyoto protocol is no better: the Kyoto protocol requires that the advanced capitalist countries reduce their

CO₂ emissions by 5 percent from 1990 to 2012; most of them are nowhere near achieving even this modest target: Japan’s emissions grew by 16 percent, the Euro-zone emissions have tended to grow since the mid-1990s, while the emissions of China and India have more than doubled.¹⁴

2. After it became clear that the Arctic Ocean was soon going to become ice-free, instead of huddling together to find ways to restore Arctic ice, the five countries with Arctic coastlines – Russia, the United States, Canada, Denmark (which controls Greenland), and Norway – began laying claims to portions of the Arctic! They have also begun moving military forces and bases to the North.¹⁵ The reason – oil. The Arctic could hold, it is estimated, as much as a quarter of the world’s undiscovered oil (and natural gas) reserves. Thanks to global warming from the burning of fossil fuels, it may be possible within a decade or so to get at the oil. But the exploitation of Arctic oil and gas would only mean that global warming is going to further accelerate, hurtling mankind still faster towards self-destruction.

The reason for this behaviour is the capitalist economy of these countries. The driving force of a capitalist economy is profit and capital accumulation. Profit accumulation requires more and more production, and more and more sales – even if it means promoting wasteful consumption. When production falters, newer ways are found to increase production, even at the cost of exploiting or degrading nature. For capital, profit is all that matters: it is willing to suck out millions of liters of groundwater to make artificial cold drinks, even if it means depletion of groundwater levels; it is willing to cut down thousands of hectares of forests to extract the minerals underneath; it is willing to put the life of future generations at risk and build nuclear power plants; it is not willing to introduce green technologies even if they are available, as that would increase the cost of production; it is willing to pollute rivers-sea-groundwater for the sake of maximizing its profits; it is not willing to stop the production of toxic chemicals which will pollute the earth for thousands of years and cause the deaths of lakhs of people from cancer and other diseases, as that will affect its profits – for instance, the chemical industry is not willing to even reduce production of plastics whose manufacture pollutes nature with dioxin, the most toxic chemical known to mankind. Capitalism is thus an unstoppable treadmill of production: the application of machinery is followed by still more application of machinery, works on a large scale are followed by work on a still larger scale, energy

consumption and raw material consumption is followed by still more energy and raw material consumption. In its drive for incessant expansion, it overexploits nature, eventually undermining it. There is thus no way in which capitalism can have a sustainable relationship with nature.

It is thus the global capitalist system that is responsible for the global ecological crisis. It is the ruling capitalist classes – who control the levers of power in the developed and underdeveloped countries and who for their profiteering are interested in maintaining this system – who are preventing humanity from making the bold decisions needed to tackle this crisis.

This can be easily understood with the help of an example. The transport sector is the biggest user of fossil fuels in the global economy. In order then to drastically reduce the global consumption of fossil fuels, the transport sector will have to be severely downsized. This means reorienting the way the global economy runs today: it would mean replacing private vehicles with public transport and promoting use of cycles for short distances – but these measures would severely affect the profitability of the car and truck manufacturing companies as well as the oil companies; it would also mean decentralizing production to reduce transport of raw materials and finished products over long distances – but the giant multinational corporations who dominate the global economy today believe in hugely centralizing production to reduce costs; etc. etc. Another sector which is a big user of fossil fuels is the agricultural sector. Reduction of fossil fuel consumption in this sector would require promotion of sustainable, organic farming practices in agriculture; but this would adversely affect the profits of the world's giant agribusiness corporations. And so these corporations are just not interested in the implementation of these measures – and it is they who control the levers of power of the global capitalist economy.

Thus, it is simply not possible for the capitalist system with its ruthless greed for more and more profits to take the necessary steps to check global warming.

Despite creating immense wealth, capitalism has failed to provide food, education and health care to hundreds of millions of people the world over. Now its drive for profits is threatening to destroy life on earth. The people of the world will have to come together and fight to build an alternative system whose inherent logic is not exploitation of nature for the profit maximization of a few but the well-being of the vast majority in harmony with nature. Only then will it be possible for human

civilisation to prevent the global warming crisis from crossing critical tipping points, or if that is not possible, to at least survive the crisis. This is the key question that anyone who is seriously concerned with the global ecological crisis will have to confront.



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Ecology: The Moment of Truth

John Bellamy Foster, Brett Clark,
and Richard York
Monthly Review, July-August, 2008

It is impossible to exaggerate the environmental problem facing humanity in the twenty-first century. Nearly fifteen years ago one of us observed: “We have only four decades left in which to gain control over our major environmental problems if we are to avoid irreversible ecological decline.”¹ Today, with a quarter-century still remaining in this projected time line, it appears to have been too optimistic. Available evidence now strongly suggests that under a regime of business as usual we could be facing an irrevocable “tipping point” with respect to climate change within a mere decade.² Other crises such as species extinction (percentages of bird, mammal, and fish species “vulnerable or in immediate danger of extinction” are “now measured in double digits”);³ the rapid depletion of the oceans’ bounty; desertification; deforestation; air pollution; water shortages/pollution; soil degradation; the imminent peaking of world oil production (creating new geopolitical tensions); and a chronic world food crisis—all point to the fact that the planet as we know it and its ecosystems are stretched to the breaking point. The moment of truth for the earth and human civilization has arrived.

To be sure, it is unlikely that the effects of ecological degradation in our time, though enormous, will prove “apocalyptic” for human civilization within a single generation, even under conditions of capitalist business as usual. Measured by normal human life spans, there is doubtless considerable time still left before the full effect of the current human degradation of the planet comes into play. Yet, the period remaining in which we can avert future environmental catastrophe, before it is essentially out of our hands, is much shorter. Indeed, the growing sense of urgency of environmentalists has to do with the prospect of various tipping points being reached as critical ecological thresholds are crossed, leading to the possibility of a drastic contraction of life on earth.

Such a tipping point, for example, would be an ice free Arctic, which could happen within two decades or less (some scientists believe as early as 2013). Already in summer 2007 the Arctic lost *in a single week* an area of ice almost twice the size of Britain. The vanishing Arctic ice cap means an enormous reduction in the earth’s reflectivity (albedo), thereby sharply increasing global warming (a positive feedback known

as the “albedo flip”). At the same time, the rapid disintegration of the ice sheets in West Antarctica and Greenland points to rising world sea levels, threatening coastal regions and islands.⁴

The state of the existing “planetary emergency” with respect to climate change was captured this year by James Hansen, director of NASA’s Goddard Institute for Space Studies and the leading U.S. climatologist:

“Our home planet is dangerously near a tipping point at which human-made greenhouse gases reach a level where major climate changes can proceed mostly under their own momentum. Warming will shift climatic zones by intensifying the hydrologic cycle, affecting freshwater availability and human health. We will see repeated coastal tragedies associated with storms and continuously rising sea levels. The implications are profound, and the only resolution is for humans to move to a fundamentally different energy pathway within a decade. Otherwise, it will be too late for one-third of the world’s animal and plant species and millions of the most vulnerable members of our own species.”⁵

According to environmentalist Lester Brown in his *Plan B 3.0*, “We are crossing natural thresholds that we cannot see and violating deadlines that we do not recognize. Nature is the time keeper, but we cannot see the clock.... We are in a race between tipping points in the earth’s natural systems and those in the world’s political systems. Which will tip first?”⁶ As the clock continues to tick and little is accomplished it is obvious that the changes to be made have to be all the more sudden and massive to stave off ultimate disaster. This raises the question of more revolutionary social change as an ecological as well as social necessity.

Yet, if revolutionary solutions are increasingly required to address the ecological problem, this is precisely what the existing social system is guaranteed not to deliver. Today’s environmentalism is aimed principally at those measures necessary to lessen the impact of the economy on the planet’s ecology without challenging the economic system that in its very workings produces the immense environmental problems we now face. What we call “the environmental problem” is in the end primarily a problem of political economy. Even the boldest establishment economic attempts to address climate change fall far short of what is required to protect the earth—since the “bottom line” that constrains all such plans under capitalism is the necessity of continued, rapid growth in production and profits.

The Dominant Economics of Climate Change

The economic constraint on environmental action can easily be seen by looking at what is widely regarded as the most far-reaching establishment attempt to date to deal with *The Economics of Climate Change* in the form of a massive study issued in 2007 under that title, commissioned by the UK Treasury Office.⁷ Subtitled the *Stern Review* after the report's principal author Nicholas Stern, a former chief economist of the World Bank, it is widely viewed as the most important, and most progressive mainstream treatment of the economics of global warming.⁸ The *Stern Review* focuses on the target level of carbon dioxide equivalent (CO_{2e}) concentration in the atmosphere necessary to stabilize global average temperature at no more than 3°C (5.4°F) over pre-industrial levels. (CO_{2e} refers to the six Kyoto greenhouse gases—carbon dioxide [CO₂], methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—all expressed in terms of the equivalent amount of CO₂. While CO₂ concentration in the atmosphere today is 387 parts per million [ppm], CO_{2e} is around 430 ppm.)

The goal proposed by most climatologists has been to try to prevent increases in global temperature of more than 2°C above pre-industrial levels, requiring stabilization of atmospheric CO_{2e} at 450 ppm, since beyond that all sorts of positive feedbacks and tipping points are likely to come into play, leading to an uncontrollable acceleration of climate change. Indeed, James Hansen and other climatologists at NASA's Goddard Institute for Space Studies have recently argued: "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm."⁹ The *Stern Review*, however, settles instead for a global average temperature increase of no more than 3°C (a threshold beyond which the environmental effects would undoubtedly be absolutely calamitous), which it estimates can likely be achieved if CO_{2e} in the atmosphere were stabilized at 550 ppm, roughly double pre-industrial levels.

Yet, the *Stern Review* acknowledges that current environmental sensitivities "imply that there is up to a one-in-five chance that the world would experience a warming in excess of 3°C above pre-industrial [levels] even if greenhouse gas concentrations were stabilised at today's level of 430 ppm CO_{2e}." Moreover, it goes on to admit that "for stabilisation at 550 ppm CO_{2e}, the chance of exceeding 3°C rises to 30–70%." A 3°C

increase would bring the earth's average global temperature to a height last seen in the "middle Pliocene around 3 million years ago." Furthermore, such an increase might be enough, the *Stern Review* explains, to trigger a shutdown of the ocean's thermohaline circulation warming Western Europe, creating abrupt climate change, thereby plunging Western Europe into Siberian-like conditions. Other research suggests that water flow in the Indus may drop by 90 percent by 2100 if global average temperatures rise by 3°C, potentially affecting hundreds of millions of people. Studies by climatologists indicate that at 550 ppm CO_{2e} there is more than a 5 percent chance that global average temperature could rise in excess of 8°C (14.4°F). All of this suggests that a stabilization target of 550 ppm CO_{2e} could be disastrous for the earth as we know it as well as its people.

Why then, if the risks to the planet and civilization are so enormous, does the *Stern Review* emphasize attempting to keep global warming at 3°C by stabilizing CO_{2e} at 550 ppm (what it describes at one point as "the upper limit to the stabilisation range")? To answer this it is necessary to turn to some additional facts of a more economic nature.

Here it is useful to note that an atmospheric concentration level close to 550 ppm CO_{2e} would result by 2050 if greenhouse gas emissions simply continued at present levels without any increases in the intervening years. However, as the *Stern Review* itself notes, this is unrealistic under business as usual since global greenhouse gas emissions can be expected to continue to increase on a "rapidly rising trajectory." Hence, an atmospheric CO_{2e} level of 550 ppm under more realistic assumptions would be plausibly reached by 2035. This would increase the threat of CO_{2e} level touching 750 ppm (or more) and a rise in global average temperature in excess of 4.3°C within the next few decades after that. (Indeed, IPCC scenarios include the possibility that atmospheric carbon could rise to 1,200 ppm and global average temperature by as much as 6.3°C by 2100.)

To counter this business-as-usual scenario, the *Stern Review* proposes a climate stabilization regime in which greenhouse gas emissions would peak by 2015 and then drop 1 percent per year after that, so as to stabilize at a 550 ppm CO_{2e} (with a significant chance that the global average temperature increase would thereby be kept down to 3°C).

But, given the enormous dangers, why not aim at deeper cuts in greenhouse gas emissions, a lower level of atmospheric CO_{2e}, and a smaller increase in global average temperature? After all, most climatologists have

been calling for the stabilization of atmospheric CO_{2e} at 450 ppm or less, keeping the global temperature increase at about 2°C above pre-industrial levels. While Hansen and his colleagues at NASA's Goddard Institute have now gone even further arguing that the target should be 350 ppm CO₂.

The *Stern Review* is very explicit, however, that such a radical mitigation of the problem should not be attempted. The costs to the world economy of ensuring that atmospheric CO_{2e} stabilized at present levels or below would be prohibitive, destabilizing capitalism itself. "Paths requiring very rapid emissions cuts," we are told, "are unlikely to be economically viable." If global greenhouse gas emissions peaked in 2010 the annual emissions reduction rate necessary to stabilize atmospheric carbon at 450 ppm, the Stern Review suggests, would be 7 percent, with emissions dropping by about 70 percent below 2005 levels by 2050. This is viewed as economically insupportable.

Hence, the *Stern Review's* own preferred scenario, as indicated, is a 550 ppm target that would see global greenhouse gas emissions peak in 2015, followed by emission cuts at a rate of 1 percent per year. By 2050 the reduction in the overall level of emissions (from 2005 levels) in this scenario would only be 25 percent. Only the 550 ppm target, the *Stern Review* suggests, is truly economically viable because "it is difficult to secure emission cuts faster than about 1% per year except in instances of recession" or as the result of a major social upheaval such as the collapse of the Soviet Union.

Indeed, the only actual example that the *Stern Review* is able to find of a sustained annual cut in greenhouse gas emissions of 1 percent or more, coupled with economic growth, among leading capitalist states was the United Kingdom in 1990–2000. Due to the discovery of North Sea oil and natural gas, the United Kingdom was able to switch massively from coal to gas in power generation, resulting in a 1 percent average annual drop in its greenhouse gas emissions during that decade. France came close to such a 1 percent annual drop in 1977–2003, reducing its greenhouse gas emissions by 0.6 percent per year due to a massive switch to nuclear power. By far the biggest drop for a major state was the 5.2 percent per year reduction in greenhouse gas emissions in the former Soviet Union in 1989–98. This however went hand in hand with a social-system breakdown and a drastic shrinking of the economy. All of this signals that any reduction in CO_{2e} emissions beyond around 1 percent per year would make it virtually impossible to maintain strong economic growth—the bottom line of the capitalist economy.

Consequently, in order to keep the treadmill of profit and production going the world needs to risk environmental Armageddon.¹⁰

Accumulation and the Planet

None of this should surprise us. Capitalism since its birth, as Paul Sweezy wrote in "Capitalism and the Environment," has been "a juggernaut driven by the concentrated energy of individuals and small groups single-mindedly pursuing their own interests, checked only by their mutual competition, and controlled in the short run by the impersonal forces of the market and in the longer run, when the market fails, by devastating crises." The inner logic of such a system manifests itself in the form of an incessant drive for economic expansion for the sake of profits and accumulation. Nature and human labor are exploited to the fullest to fuel this juggernaut, while the destruction wrought on each is externalized so as to not fall on the system's own accounts.

"Implicit in the very concept of this system," Sweezy continued, "are interlocked and enormously powerful drives to both creation and destruction. On the plus side, the creative drive relates to what humankind can get out of nature for its own uses; on the negative side, the destructive drive bears most heavily on nature's capacity to respond to the demands placed on it. Sooner or later, of course, these two drives are contradictory and incompatible." Capitalism's overexploitation of nature's resource taps and waste sinks eventually produces the negative result of undermining both, first on a merely regional, but later on a world and even planetary basis (affecting the climate itself). Seriously addressing environmental crises requires "a reversal, not merely a slowing down, of the underlying trends of the last few centuries." This, however, cannot be accomplished without economic regime change.¹¹

Why Not?

In 1884, William Morris, one of the great creative artists, revolutionary socialist intellectuals, and environmental thinkers of the late nineteenth century, wrote an article entitled "Why Not?" for the socialist journal *Commonweal*. He was especially concerned with the fact that most people, including many socialists in his time, in rebelling against the evils of capitalism, tended to picture the future in terms that were not that far removed from many of the worst, most environmentally and humanly destructive, aspects of capitalism itself.

"Now under the present Capitalist system," Morris observed, it is difficult to see anything which might stop the growth of these horrible

brick encampments; its tendency is undoubtedly to depopulate the country and small towns for the advantage of the great commercial and manufacturing centres; but this evil, and it is a monstrous one, will be no longer a necessary evil when we have got rid of land monopoly, manufacturing for the profit of individuals, and the stupid waste of competitive distribution.

Looking beyond the “terror and the grinding toil” in which most people were oppressed, Morris argued, there was a need to recognize other ends of social existence: most notably “the pleasure of life to be looked forward to by Socialists.” “Why,” he asked, should one third of England be so stifled and poisoned with smoke that over the greater part of Yorkshire (for instance) the general idea must be that sheep are naturally black? And why must Yorkshire and Lancashire rivers run mere filth and dye? Profits will have it so: no one any longer pretends that it would not be easy to prevent such crimes against decent life: but the ‘organizers of labour,’ who might better be called ‘organizers of filth,’ know that it wouldn’t pay; and as they are for the most part of the year safe in their country seats, or shooting – crofters’ lives – in the Highlands, or yachting in the Mediterranean, they rather like the look of the smoke country for a change as something, it is to be supposed, stimulating to their imaginations concerning – well, we must not get theological.

In rejecting all of this, Morris asked, was it not possible to create a more decent, more beautiful, more fulfilling, more healthy, less hell-like way of living, in which all had a part in the “share of earth the Common Mother” and the sordid world of “profit-grinding” was at last brought to an end? Why Not?¹²



Notes:

(This article is slightly abridged, for reasons of space. For the full article and detailed references, see <http://monthlyreview.org>)

1. John Bellamy Foster, *The Vulnerable Planet* (New York: Monthly Review Press, 1994), p. 12.
2. James Hansen, “Tipping Point,” in E. Fearn and K. H. Redford eds, *The State of the Wild 2008* (Washington, D.C.: Island Press, 2008). See also James Hansen, “The Threat to the Planet,” *New York Times Review of Books*, July 13, 2006.
3. Lester R. Brown, *Plan B 3.0* (New York: W.W. Norton, 2008), p. 102. The share of threatened species in 2007 was 12 percent of the world’s bird species; 20 percent of the world’s mammal species; and 39 percent

of the world’s fish species evaluated. Additionally: “Recent studies predict that climate change could result in the extinction of up to half the world’s plant species by the end of the century.” See Belinda Hawkins, Suzanne Sharrock, and Kay Havens, *Plants and Climate Change* (Richmond, UK: Botanic Gardens Conservation International, 2008), p. 9.

4. David Spratt and Philip Sutton, *Climate Code Red*, <http://www.climatecodered.net>, p. 4; Brown, *Plan B 3.0*, p. 3; James Hansen, et. al., “Climate Change and Trace Gases,” *Philosophical Transactions of the Royal Society* 365 (2007), p. 1925–54; James Lovelock, *The Revenge of Gaia* (New York: Basic Books, 2006), p. 34; “Arctic Summers Ice-Free ‘by 2013,’” *BBC News*, December 12, 2007.
5. Hansen, “Tipping Point,” pp. 7–8.
6. Brown, *Plan B 3.0*, pp. 4–5.
7. Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge: Cambridge University Press, 2007).
8. The *Stern Review* has been criticized by more conservative mainstream economists: John Browne, “The Ethics of Climate Change,” *Scientific American* 298, no. 6 (June 2008), pp. 97–100; William Nordhaus, *A Question of Balance* (New Haven: Yale University Press, 2008), pp. 18, 190.
9. James Hansen, et. al., “Target Atmospheric CO₂: Where Should Humanity Aim?,” abstract of article submitted to *Science* (accessed in May 2008). Before this Hansen and his colleagues at NASA’s Goddard Institute had argued that due to positive feedbacks and climatic tipping points global average temperature increases had to be kept to less than 1°C below 2000 levels. This meant that atmospheric CO₂ needed to be kept to 450 ppm or below.
10. Stern, *The Economics of Climate Change*, pp. 4–5, 11–16, 95, 193, 220–34, 637, 649–51
11. Paul M. Sweezy, “Capitalism and the Environment,” *Monthly Review* 41, no. 2 (June 1989), pp. 1–10.
12. William Morris, “Why Not,” in Morris, *Political Writings* (Bristol: Thoemmes Press, 1994), pp. 24–27.

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Climate Change Will Devastate India

*Daphne Wysham and Smitu Kothari
Hindu, 18 April, 2007*

In South Asia, millions of people will find their lands and homes inundated, according to a draft report of the Intergovernmental Panel on Climate Change.

A FINAL draft of a report leaked from the Intergovernmental Panel on Climate Change (IPCC) to the authors lays out shocking scenarios for India and the rest of South Asia. The summary for policy makers that was released by the IPCC on Friday is a call for urgent action globally. While shocking, the fuller final draft version of the Second Working Group of the IPCC's Fourth Assessment Report, which may be watered down before final publication, makes for even more sobering reading: it lays out in explicit detail what lies ahead for India and the rest of Asia. It also presents an opportunity for the country to take the lead in defining a more secure and sustainable future for itself.

Here are some of the devastating consequences detailed in the provisional February 16, 2007, IPCC report on Asia:

Sea levels will rise by at least 40 cm by 2100, inundating vast areas on the coastline, including some of the most densely populated cities whose populations will be forced to migrate inland or build dykes — both requiring a financial and logistical challenge that will be unprecedented. In the South Asian region as a whole, millions of people will find their lands and homes inundated. Up to 88 per cent of all of Asia's coral reefs, termed the "rainforests of the ocean" because of the critical habitat they provide to sea creatures, may be lost as a result of warming ocean temperatures.

The Ganga, Brahmaputra, and Indus will become seasonal rivers, dry between monsoon rains as Himalayan glaciers continue their retreat, vanishing entirely by 2035, if not sooner. Water tables will continue to fall and the gross per capita water availability in India will decline by over one-third by 2050 as rivers dry up, water tables fall or grow more saline. Water scarcity will in turn affect the health of vast populations, with a rise in water-borne diseases such as cholera. Other diseases such as dengue fever and malaria are also expected to rise.

Crop productivity will fall, especially in non-irrigated land, as temperatures rise for all of South Asia by as much as 1.2 degrees C on

average by 2040, and even greater crop loss — of over 25 per cent — as temperatures rise to up to 5.4 degrees C by the end of the century. This means an even lower caloric intake for India's vast rural population, already pushed to the limit, with the possibility of starvation in many rural areas dependent on rainfall for their crops. Even those areas that rely on irrigation will find a growing crisis in adequate water availability.

Mortality due to heat-related deaths will climb, with the poor, the elderly and daily wage earners and agricultural workers suffering a rise in heat-related deaths.

This grim future awaits India in the coming century. The irony is that much of this damage will be self-inflicted, unless the country is prepared to make a radical, enlightened change in its energy and transportation strategies.

We are truly at a crossroads: either we can be complacent or wait for leadership from a reluctant United States, the largest greenhouse gas emitter in the world, or begin to take action now, regardless of what other countries do.

The path that India has taken thus far, of waiting until wealthy countries take action on global warming, is understandable if viewed in isolation. The U.S., the U.K., and other countries in the wealthy North, have developed their economies largely thanks to fossil fuels. It is only fair that India be allowed to attain the same standard of living before curbing its emissions.

But as the IPCC report makes clear, while it may be "fair" to do so, it is also suicidal for India to pursue any strategy but the least carbon-intensive path toward its own development. Wealthy, less populous countries in the North are very likely — and very unfairly — going to suffer fewer devastating blows to their economies, and may actually benefit with extended growing seasons, while India and other South Asian nations will dramatically and painfully suffer if action is not taken now.

Today, much of India's energy comes from coal, most of it mined in the rural areas of Orissa, Jharkhand, and Bihar with devastating consequences. Tribals and small and marginal peasants are being forced to resettle as these mines grow wider by the day. Inadequate resettlement plans mean more migration of landless populations to urban slums. The environment is being destroyed by these mines and their waste products — among them fly ash laced with heavy metals and other toxic materials. But the biggest irony of this boom in coal-fired power is that much of the power is going to export-oriented, energy-intensive industry. Look at

Orissa's coal belt and you will find a plethora of foreign-owned and Indian aluminium smelters, steel mills, and sponge iron factories — all burning India's coal, at a heavy cost to local populations — then exporting a good share of the final product to China, the U.S. or other foreign markets.

Volatile mix

Add to the problem of export-oriented, energy-intensive industry the problem of carbon trades, and you have a volatile mix. India is one of the top destinations globally in the growing carbon market. In exchange for carbon trade projects in India, wealthy polluters in the North are able to avoid restrictions on their own emissions. Rather than financing “clean development” projects as promised, many of these trades are cheap, dirty, and harmful to the rural poor. Fast-growing eucalyptus plantations are displacing farmers from their lands and tribals from their forests. Sponge-iron factories are garnering more money from carbon trades earned by capturing “waste heat” than from the production of the raw material itself. Toxic fly ash from coal-fired power plants is being turned into bricks, and the carbon that would have been released from traditional clay-fired brick kilns is now an invisible commodity that can be sold as carbon credits. These carbon trades are not helping finance clean energy and development for India's rural poor.

Add to this the special economic zones or SEZs – forcing people off their land, where blood, often of the most vulnerable, is shed at the altar of development.

Global warming will tighten this growing squeeze to a noose, as huge areas of Bangladesh go underwater and environmental refugees flood across India's borders. The leaked final draft of the IPCC report shows that Bangladesh is slated to lose the largest amount of land globally – approximately 1000 square km of cultivated land – due to sea level rise. Where will all of those hungry, thirsty, landless millions go? Most will flock to the border looking for avenues to enter, exacerbating an already tense situation not only in the states contiguous to Bangladesh but in cities as far off as Mumbai and Delhi.

Undoubtedly, global warming is not fair. It is exacting the highest price on those least responsible for the problem. But India can show the world that there is another way forward, a self-interested, self-preserving way, focussed on: clean energy such as solar and wind; on energy efficiency; on providing for its own population's energy needs ahead of

foreign corporations; on public transportation plans that strengthen India's vast network of rail and bus transportation routes, rather than weakening it with public subsidies to massive highways and to automakers. The IPCC final draft report urges India and other Asian countries to prepare for the coming climate apocalypse with crop varieties that can withstand higher temperatures, salinated aquifers, and an increase in pests. It also advises better water resource management and better disease monitoring and control. While these are important, prevention is always the best medicine.

The IPCC final draft report should be seen as a conservative assessment of what lies in store. It clearly implies that incremental or palliative responses to reduce vulnerability are not the answer. India and other countries of the region need to take a preventative approach by moving their economies away from fossil fuels and towards clean, renewable forms of energy. This is the only way of creating a sustainable way of life that could be a model for the world. If it pursues what is “fair” in a warming world by continuing to argue that industrialised nations are to blame and so they need to take urgent action first, it will be placing the noose around its own neck while the hangman looks on.

■ ■ ■

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'The Arctic is often cited as the canary in the coalmine for climate warming ... and now as a sign of climate warming, the canary has died. It is time to start getting out of the coal mines.'

Jay Zwally, NASA scientist

Antarctic's Ice Vanishing Faster than Expected

Steve Connor

The New Zealand Herald, Jan 15, 2008

Parts of the ice sheets covering Antarctica are melting faster than predicted, and the loss of ice has probably accelerated in recent years because of global warming, a study has found.

A satellite survey between 1996 and last year found that the net loss of ice from Antarctica rose by about 75 per cent as the movement of glaciers towards the sea speeded up.

Scientists say the West Antarctic ice sheet lost about 132 billion tonnes of ice last year, compared with a loss of 83 billion tonnes in 1996.

As well, the Antarctic peninsula lost about 60 billion tonnes of ice last year.

“To put these figures into perspective, four billion tonnes of ice is enough to provide drinking water for the whole UK population for one year,” said Professor Jonathan Bamber, of the University of Bristol. “We think the glaciers of the Antarctic are moving faster to the sea. The computer models of future sea-level rise have not really taken this into account.”

Sea levels are estimated to have risen by 1.8mm a year on average during the 20th century, but data from the past decade or so suggest that the average rise is now about 3.4mm a year.

Computer models used by the Intergovernmental Panel on Climate Change, which predict that sea levels will rise by no more than about 50cm by 2100, are based largely on the stability of the Antarctic ice sheets. But many scientists now believe this forecast is too restrained.

“I agree with a number of scientists who feel the IPCC is likely to have underestimated the upper bound of predicted sea-level rise by the end of the century – 50cm is probably too conservative,” Professor Bamber said.

There are two main factors in estimating the net loss of Antarctic ice. The first is the flow of glaciers towards the sea; the second is the build-up of snow over the vast landmass of the frozen continent.

The climate change panel's models imply that global warming will increase the moisture content of the atmosphere and so may increase snowfall over Antarctica, much of which is too cold to be affected by rising global temperatures.

This would suggest a net build-up of ice. However, Professor Bamber believes the models have not taken into account the complex, interaction between the ocean and the ice shelves of West Antarctica and the Antarctic Peninsula, which are warmer than East Antarctica.

Eric Rignot, who led the latest study – published in the journal *Nature Geoscience* – said the findings indicated a rapid loss of ice to the sea rather than a net gain.

“We have determined that the loss is increasing with time, quite rapidly at 75 per cent in 10 years,” Dr Rignot said. “We have also established that most of this loss, if not its entirety, is caused by glacier acceleration. The IPCC focused on the surface mass balance component. We find this component is not indicative of the true mass balance.”

The acceleration in ice loss over the past 10 years could increase in coming decades, he added. “As some of these glaciers reach deeper beds, their speeds could double or triple, in which case the contribution to sea-level rise from Antarctica could increase quite significantly beyond what it is now. Many people suspect Antarctic ice to be immune from changes. We are finding this is not the case. The potential exists for ice speed to increase two or three times, which will result in a doubling of the mass deficit from Antarctica.”

Back to Water

Ice loss on the West Antarctic Ice Sheet:

- 1996 : 83 billion tonnes
- 2006 : 132 billion tonnes

■ ■ ■

Steve Connor is Science Editor of The Independent. He has won several ABSW Science Writers' Awards, among other prizes. He has a degree in zoology from the University of Oxford.

Ice-capped Roof Of World Turns To Desert

Geoffrey Lean
The Independent, 08 May 2006

Global warming is rapidly melting the ice-bound roof of the world, and turning it into desert, leading scientists have revealed.

The Chinese Academy of Sciences – the country’s top scientific body – has announced that the glaciers of the Tibetan plateau are vanishing so fast that they will be reduced by 50 per cent every decade. Each year enough water permanently melts from them to fill the entire Yellow River.

They added that the vast environmental changes brought about by the process will increase droughts and sandstorms over the rest of the country, and devastate many of the world’s greatest rivers, in what experts warn will be an “ecological catastrophe”.

The plateau, says the academy, has a staggering 46,298 glaciers, covering almost 60,000 square miles. At an average height of 13,000 feet above sea level, they make up the largest area of ice outside the polar regions, nearly a sixth of the world’s total.

The glaciers have been receding over the past four decades, as the world has gradually warmed up, but the process has now accelerated alarmingly. Average temperatures in Tibet have risen by 2 degrees Fahrenheit over the past 20 years, causing the glaciers to shrink by 7 per cent a year, which means that they will halve every 10 years.

Prof Dong Guangrong, speaking for the academy – after a study analysing data from 680 weather stations scattered across the country – said that the rising temperatures would thaw out the tundra of the plateau, turning it into desert.

He added: “The melting glaciers will ultimately trigger more droughts, expand desertification and increase sand storms.” The water running off the plateau is increasing soil erosion and so allowing the deserts to spread.

Sandstorms, blowing in from the degraded land, are already plaguing the country. So far this year, 13 of them have hit northern China, including Beijing. Three weeks ago one storm swept across an eighth of the vast country and even reached Korea and Japan. On the way, it dumped a mind-boggling 336,000 tons of dust on the capital, causing dangerous air pollution.

The rising temperatures are also endangering the newly built world’s highest railway, which is due to go into operation this summer. They threaten to melt the permafrost under the tracks of the £1.7bn Tibetan railway, constructed to link the area with China’s northwestern Qinghai province.

Perhaps worst of all, the melting threatens to disrupt water supplies over much of Asia. Many of the continent’s greatest rivers – including the Yangtze, the Indus, the Ganges, the Brahmaputra, the Mekong and the Yellow River - rise on the plateau.

In China alone, 300 million people depend on water from the glaciers for their survival. Yet the plateau is drying up, threatening to escalate an already dire situation across the country. Already 400 cities are short of water; in 100 of them – including Beijing – the shortages are becoming critical.

Even hopes that the melting glaciers might provide a temporary respite, by increasing the amount of water flowing off the plateau – have been dashed. Most of the water is evaporating before it reaches the people that need it – again because of the rising temperatures brought by global warming.

Yao Tandong, head of the academy’s Qinghai-Tibet Plateau Research Institute, summed it up. “The full-scale glacier shrinkage in the plateau regions will eventually lead to an ecological catastrophe,” he said.

■ ■ ■

Geoffrey Lean, the Environment Editor of the Independent on Sunday in London, has been covering the field for almost 40 years and has won many national and international awards for his work

'This is an emergency, and for emergency situations we need emergency action ...'

UN secretary-general Ban Ki-Moon,
10 November 2007

Melting Planet Threatens Species Survival

Andrew Buncombe & Severin Carrell
The Independent, 04 October, 2005

The polar bear is one of the natural world's most famous predators – the king of the Arctic wastelands. But, like its vast Arctic home, the polar bear is under unprecedented threat. Both are disappearing with alarming speed.

Thinning ice and longer summers are destroying the bears' habitat, and as the ice floes shrink, the desperate animals are driven by starvation into human settlements – to be shot. Stranded polar bears are drowning in large numbers as they try to swim hundreds of miles to find increasingly scarce ice floes. Local hunters find their corpses floating on seas once coated in a thick skin of ice.

It is a phenomenon that frightens the native people that live around the Arctic. Many fear their children will never know the polar bear. "The ice is moving further and further north," said Charlie Johnson, 64, an Alaskan Nupiak from Nome, in the state's far west. "In the Bering Sea the ice leaves earlier and earlier. On the north slope, the ice is retreating as far as 300 or 400 miles offshore."

Last year, hunters found half a dozen bears that had drowned about 200 miles north of Barrow, on Alaska's northern coast. "It seems they had tried to swim for shore ... A polar bear might be able to swim 100 miles but not 400."

His alarming testimony, given at a conference on global warming and native communities held in the Alaskan capital, Anchorage, last week, is just one story of the many changes happening across the globe. Climate change threatens the survival of thousands of species – a threat unparalleled since the last ice age, which ended some 10,000 years ago.

The vast majority, scientists will warn this week, are migratory animals – sperm whales, polar bears, gazelles, garden birds and turtles – whose survival depends on the intricate web of habitats, food supplies and weather conditions which, for some species, can stretch for 6,500 miles. Every link of that chain is slowly but perceptibly altering.

Europe's most senior ecologists and conservationists are meeting in Aviemore, in the Scottish Highlands, this week for a conference on the impact of climate change on migratory species, an event organised by the British government as part of its presidency of the European Union.

It is a well-chosen location. Aviemore's major winter employer – skiing – is a victim of warmer winters. Ski slopes in the Cairngorms, which once had snow caps year round on the highest peaks, have recently been closed down when the winter snow failed. The snow bunting, ptarmigan and dotterel – some of Scotland's rarest birds – are also given little chance of survival as their harsh and marginal winter environments disappear.

A report being presented this week in Aviemore reveals this is a pattern being repeated around the world. In the sub-Arctic tundra, caribou are threatened by "multiple climate change impacts". Deeper snow at higher latitudes makes it harder for caribou herds to travel. Faster and more regular "freeze-thaw" cycles make it harder to dig out food under thick crusts of ice-covered snow. Wetter and warmer winters are cutting calving success, and increasing insect attacks and disease.

The same holds true for migratory wading birds such as the red knot and the northern seal. The endangered spoon-billed sandpiper, too, faces extinction, the report says. They are of "key concern". It says that species "cannot shift further north as their climates become warmer. They have nowhere left to go ... We can see, very clearly, that most migratory species are drifting towards the poles."

The report, passed to *The Independent* on Sunday, and commissioned by the Department for the Environment, Food and Rural Affairs (Defra), makes gloomy predictions about the world's animal populations. "The habitats of migratory species most vulnerable to climate change were found to be tundra, cloud forest, sea ice and low-lying coastal areas," it states. "Increased droughts and lowered water tables, particularly in key areas used as 'staging posts' on migration, were also identified as key threats stemming from climate change."

Some of its findings include:

- Four out of five migratory birds listed by the UN face problems ranging from lower water tables to increased droughts, spreading deserts and shifting food supplies in their crucial "fuelling stations" as they migrate.
- One-third of turtle nesting sites in the Caribbean would be swamped by a sea level rise of 50cm. This will "drastically" hit their numbers. At the same time, shallow waters used by the endangered Mediterranean monk seal, dolphins, dugongs and manatees will slowly disappear.
- Whales, salmon, cod, penguins and kittiwakes are affected by shifts in distribution and abundance of krill and plankton, which has "declined

in places to a hundredth or thousandth of former numbers because of warmer sea-surface temperatures.”

- Increased dam building, a response to water shortages and growing demand, is affecting the natural migration patterns of tucuxi, South American river dolphins, “with potentially damaging results”.
- Fewer chiffchaffs, blackbirds, robins and song thrushes are migrating from the UK due to warmer winters. Egg-laying is also getting two to three weeks earlier than 30 years ago, showing a change in the birds’ biological clocks.

The science magazine *Nature* predicted last year that up to 37 per cent of terrestrial species could become extinct by 2050. And the Defra report presents more problems than solutions. Tackling these crises will be far more complicated than just building more nature reserves – a problem that Jim Knight, the nature conservation minister, acknowledges.

A key issue in sub-Saharan Africa, for instance, is profound poverty. After visiting the Democratic Republic of the Congo last month, Mr Knight found it difficult to condemn local people eating gorillas, already endangered. “You can’t blame an individual who doesn’t know how they’re going to feed their family every day from harvesting what’s around them. That’s a real challenge,” he said.

And the clash between nature and human need – a critical issue across Africa – is likely to worsen. As its savannah and forests begin shifting south, migratory animals will shift along with them. Some of the continent’s major national parks and reserves – such as the Masai-Mara or Serengeti – may also have to move their boundaries if their game species, the elephant and wildebeest, are to be properly protected. This will bring conflict with local communities.

There is also a gap in scientific knowledge between what has been discovered about the impact of climate change in the industrialised world and in less developed countries. Similarly, fisheries experts know more about species such as cod and haddock, than they do about fish humans don’t eat.

Many environmentalists are pessimistic about the prospects of halting, let alone reversing, this trend. “Are we fighting a losing battle? Yes, we probably are,” one naturalist told the IoS last month.

The UK, which is attempting to put climate change at the top of the global agenda during its presidency of the G8 group of industrialised nations, is still struggling to persuade the American, Japanese and

Australian governments to admit that mankind’s gas emissions are the biggest threat. These three continue to insist there is no proof that climate change is largely manmade. And many British environmentalists suspect that Tony Blair’s public commitment to a tougher global treaty to replace the Kyoto Protocol, aimed at a 60 per cent cut in carbon dioxide emissions by 2050, is not being backed up by the Government in private.

Despite President George Bush’s resistance to a new global climate treaty, many US states are being far more radical. Even the G8 communiqué after the Gleneagles summit in July had Bush confirming that the climate was warming.

In Alaska last week, satellite images released by two US universities and the space agency Nasa revealed that the amount of sea-ice cover over the polar ice cap has fallen for the past four years. “A long-term decline is under way,” said Walt Meier of the National Snow and Ice Data Centre.

The Arctic’s native communities don’t need satellite images to tell them this. John Keogak, 47, an Inuvialuit from Canada’s North-West Territories, hunts polar bears, seals, caribou and musk ox. “The polar bear is part of our culture,” he said. “They use the ice as a hunting ground for the seals. If there is no ice there is no way the bears will be able to catch the seals.” He said the number of bears was decreasing and feared his children might not be able to hunt them. He said: “There is an earlier break-up of ice, a later freeze-up. Now it’s more rapid. Something is happening.”

And now, said Mr Keogak, there was evidence that polar bears are facing an unusual competitor – the grizzly bear. As the sub-Arctic tundra and wastelands thaw, the grizzly is moving north, colonising areas where they were previously unable to survive. Life for Alaska’s polar bears is rapidly becoming very precarious.

Some species vanishing from the earth

Mountain gorilla: Already listed as “critically endangered”, only about 700 mountain gorillas, including the distinctively marked adult male silverbacks, migrate within the cloud forests of the volcanic Virunga mountains of the Democratic Republic of the Congo, Rwanda and Uganda. After a century of human persecution it faced extinction. Now its unique but marginal mountain forests Thomson’s gazelle already heavily reduced by forestry – are shrinking, because of climate change. It will

be forced to climb higher for cooler climates, but will effectively run out of mountain.

Savannah elephant: Across Africa, habitats are shifting as temperatures rise, or disappearing in droughts, affecting the migrations of millions of wildebeest, Thomson's gazelle and savannah elephant. This will hit game reserves and national parks – forcing many to move their boundaries.

Green turtle: The number of male green turtles is falling because of rising temperatures, threatening their survival. Turtle nests need a temperature of precisely 28.8°C to hatch even numbers of males and females. On Ascension Island, where nest temperatures are up 0.5°C, females now outnumber males three to one. On Antigua too, nest temperatures for hawksbill turtles are higher than the ideal incubation level. Hatchling survival rates are also cut by higher temperatures. Egg-laying beaches for all species of turtle are being lost to rising sea levels. A third of nesting beaches in the Caribbean would be lost by a 50cm rise in sea level.

Saiga antelope: This rare antelope, thought to be half-way between an antelope and a sheep, and found in Russia and Mongolia, is “critically endangered”. Hunted heavily, its autumn migration to escape bitter weather and spring migration to find water and food are being hit by unusual weather cycles. The antelope will be forced by climate instability to find new grazing areas, coming into conflict with humans. Bad years can cut its numbers by 50 per cent, because of high mortality and poor birth rates.

Sperm whale: The migration of the sperm whale, one of the earth's largest mammals, made famous by Herman Melville's epic Moby-Dick, is closely linked to the squid, its main food source. Squid numbers are affected by warmer water and weather phenomena such as El Niño. Adult male sperm whales up to 20m long like cold water in the disappearing ice-packs. Warm water cuts sperm whale reproduction because food supplies fall. Around the Galapagos Islands, a fall in births is linked to higher sea surface temperatures. Plankton and krill, key foods for many cetaceans such as the pilot whale, have in some regions declined 100-fold in warmer water.



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Cars vs. Buses: Do We Have a Choice Any Longer?

Abhijit M.

The reason for global warming is well known – the increased greenhouse effect due to the increased concentration of greenhouse gases like carbon dioxide (CO₂) and methane (CH₄) in the environment. Where is this increase in CO₂ and CH₄ coming from? The answer is simple: through the burning of fossil fuels – primarily oil, petroleum products and coal.

An important culprit – vehicular pollution

It is well established now that more than 20% of the world's CO₂ emissions are due to vehicular pollution. The biggest culprit is the United States: it produces one quarter of the global carbon emissions, and motor vehicles are responsible for almost a quarter of these emissions. Australia is another big polluter, and here too its transport sector is the third largest as well as one of the fastest growing sources of the nation's emissions. Yet these are the very countries that have refused to sign the Kyoto protocol, which only demands slight cuts in emissions by the developed countries.

Now, in their race to copy the American way of life, even underdeveloped countries like India and China are increasingly emitting more and more greenhouse gases: since 1990, China's and India's emissions have more than doubled, and China has now overtaken the United States to become the world's largest emitter of greenhouse gases. China has around 50 million vehicles on the road and is soon expected to become the biggest car market in the world, crossing the United States.

The money involved in automobile and related industries like oil industry, highway and flyover construction industry, dealers and repair shops, is huge. Corporations are driven solely by profits, their only desire is to increase production and accumulate profits. With billions of dollars in profits at stake, these corporations are only interested in producing and selling an ever increasing number of cars, and hence an increasing consumption of more and more oil, ignoring the threat of global warming. It is these giant corporations and their interests of profiteering who are the chief culprits for the global warming crisis which is threatening the very survival of humanity.

The “American Dream of Freedom on Wheels”

The beginnings of this great worldwide automobile boom were made in the USA in the 1920s. The automaker General Motors (GM) began a covert campaign to undermine the popular rail-based public transit systems that were ubiquitous in and around the country’s bustling urban areas. At that time, only one in 10 Americans owned cars and most people traveled by trolley and streetcar. Alfred P. Sloan, GM’s president at the time, declared, “We’ve got 90 percent of the market out there that we can...turn into automobile users. If we can eliminate the rail alternatives, we will create a new market for our cars.” And GM did just that. With help from Standard Oil, Firestone Tire, Mack Truck and Phillips Petroleum, by 1955, it had forced the closure of most trolleys and streetcars, despite public opinion polls showing that most people favoured the expansion of rail based public transport systems. Simultaneously, using its political clout, it got the government to fund the building of roads from coast to coast. And GM’s promotional films began showcasing America’s burgeoning interstate highway system as the realization of the so-called “American dream of freedom on wheels.”

As the dream came true for the car making companies, it became a nightmare for the people. The increasing number of cars led to increasing problems of traffic congestion, pollution and accidents. This phenomenon did not stop at the borders of the United States. It spread to the European countries. When markets in the West got saturated, the car making companies turned East. With ‘Globalization’, this American dream got a new boost. Now it was the turn of third world countries like India to be the targets of the automobile corporations. Like in the United States, in all these countries, governments facilitated this boom in private cars by providing huge subsidies in the form of building the necessary infrastructure – roads, highways, flyovers, car parking lots.

Today both foreign and Indian car makers are targeting the Indian car market in a big way – 15 lakh cars are sold annually in India, making India’s passenger car market one of the fastest growing in the world. Now Tata is hoping to expand this market further by making a ‘cheap’ car – his mantra for selling “Nano” is that he is fulfilling the ‘dream’ of the Indian middle class. Never mind the resulting congestion, pollution, and further increase in global warming. The American Dream has just got Indianized.

With the earth facing global ecological devastation, it is obvious that the lifestyle promoted by this ‘American Dream’ is simply unsustainable,

both for America and India, actually for entire planet Earth.

The Alternative: Reducing the number of vehicles

If mankind is to survive the global warming crisis, the carbon emissions must be drastically reduced. One way of doing that is to sharply reduce the number of vehicles on the roads. That can be done by improving public transport. A bus can carry 50 people, thus reducing the need for 50 private vehicles, thereby considerably reducing carbon emissions and pollution. The actual reduction of carbon emissions is much more than this, because of the reduced pollution involved in manufacturing one bus as compared to fifty cars or two-wheelers; and because of the reduced environmental cost of building low capacity roads for buses as compared to high capacity roads for cars.

An increasing number of private vehicles also demands wider roads and more parking spaces, which means that roadside trees are cut and parks are transformed into parking lots, thus adding to global warming woes. On the other hand, their replacement by public transport leads to reduction of congestion and creation of open spaces, making it possible to restore greenery, thus further countering global warming.

Need to subsidize public transport

If people are to be enticed into using public transport in place of their private vehicles, bus services must be good, must be available round the clock, must be cheap, and must have good connectivity, that is, buses must be available to every corner of the city. This means the number of buses must be high.

Public bus service must be cheap from another perspective too: it is an essential service like education and health, and must be affordable to the poor. Such a bus service increases their mobility, enables them to save a considerable amount of time and thus increases their efficiency. Increased investment (erroneously called ‘subsidies’ in the free market lingua of today) in welfare services by the state helps people realize their inherent potential, helping them create more wealth in the long term, which will be much more than the ‘subsidy’ invested on them.

All this obviously means that the public transport system is going to run at a loss. Therefore, to be an effective alternative, public transport must be subsidized by the government. Chennai is one good example, where the City Corporation and the State Government subsidize all capital expenses. That explains why one can travel 46 kms for just Rs.7 in Chennai, while it costs Rs.23 in Pune.

But that's not enough!

To reduce the number of vehicles on the roads, having a good public transport system is not sufficient. Simultaneously, in order to discourage people from using private vehicles, some form of restrictions on their use must be imposed. Some of the possible measures that can be taken are: congestion taxing, green cess on fuel, high parking charges, reducing parking spaces, banning entry of cars in commercial centers to create walking plazas, high ownership charges, restricted entry during rush hours, etc.

Many cities around the world, from Singapore and Stockholm to London and Rome, have introduced congestion taxing, which means charging a fee for entering designated areas of the city, normally the city's commercial area. Cities that have implemented congestion taxing have reported traffic volume reductions of between 10-30%. Singapore has also introduced high annual road tax, custom duties, high parking charges, and heavy vehicle registration fees. As a result, and despite having one of the highest per capita incomes in Asia, fewer than 30% of Singaporean households own cars. Many European cities too have adopted similar measures.

Other benefits of reduced congestion

The impact of emissions from vehicles on people's health is enormous. Car exhausts release a range of toxic substances including carbon monoxide, benzene, lead, and tiny suspended particles; it is now well established that these lead to a sharp rise in respiratory diseases, especially in children; apart from that, the pollutants also affect the heart, the central nervous system and the immune system of the body.

Therefore, restricting the number of vehicles in a city leads to considerable improvement in 'quality of life' for its residents: there are numerous health benefits; the reduced congestion makes it possible to have more open spaces and so more gardens and greenery in the city; finally, reduced congestion also leads to a sharp drop in accidents, considerably reducing the daily stress.

The case for free public transport

In fact, the need of the hour is to make public transport entirely free. Considering that governments are spending billions of dollars bailing out ailing automobile corporations, they can surely spend a few million dollars on taking steps to drastically reduce the number of private vehicles on the roads, as that would reduce global warming which is pushing the

world towards catastrophic conditions. Much of the benefits in terms of huge improvement in quality of life due to improved air quality, no congestion, open spaces and peace of mind due to drastic reduction in risk of accidents cannot be measured in monetary terms. And for a country like India, this is also a very viable proposition commercially: the foreign exchange savings, savings in oil consumption, and savings in medical bills from improved air quality and reduced accidents will be far more than the cost of providing this free transport.

Many cities all over the world have recognized this. More than 20 cities around the world run some or the other type of free public transport today. The actual cost of providing free transport is much less than on paper, because as people shift from private cars to public transport, expensive investments in street widening and parking facilities no longer need to be made.

Promoting cycling

The crisis of global warming is so acute that it is not sufficient to reduce the number of private vehicles on the roads, actually the entire transport sector needs to be downsized. This calls for an entirely new approach to transportation planning for the entire economy.

One measure that is being adopted in Europe with some success is promoting cycling. Cycling is not only a clean and energy efficient transport mode, it is also a very efficient way of using road space. And of course, its health benefits are enormous. Many European cities are spending billions of dollars on cycling policies: promoting cycling use, improving infrastructure for cycling like having separate and good roads for cycles, integrating cycling with public transport use, and other such measures. Simultaneously, they are adopting transport policies to make it difficult to commute within the city by private cars. This has seen considerable success in some countries: for instance, in Netherlands, from one-third to half of all journeys are made by bicycles, and in Denmark one in six.

The Pune Situation

The city of Pune serves as an excellent example of how the current pattern of 'development' can kill a city. In a city of 50 lakh people, there are now more than 23 lakh vehicles. Of which around 16 lakh are two wheelers while nearly 3.5 lakh are four wheelers. The number has doubled from around 11.5 lakhs to 23 lakhs in just four years, from 2004 to 2008. Thus the number of vehicles in the city is growing at an annual rate of 18%. The growing traffic congestion has made the city one of the most

polluted in the country, and according to statistics provided by Pune Police, on the average at least one person dies every day in road accidents.

The central reason for this spiraling growth in the number of private vehicles is the dismal state of the city public transport system. This can be well understood by a comparison with Mumbai, where the public transport system is much better: the number of vehicles in Mumbai is less than in Pune, despite the fact that the population is 5 times that of Pune. For nearly 10 years, the number of public transport buses (PMPML) in Pune city has been stagnant at around 1000. On top of it, the buses are in a rickety shape, and rate of breakdowns is also very high. This, together with corruption and inefficiency of the PMPML, has resulted in such a terrible public transport system that whoever can afford it purchases a two wheeler or a four wheeler to commute. There are valid reasons to believe that powerful vested interests, in the form of the strong presence of automobile companies in Pune and the strong business interests of local politicians who themselves are automobile distributors and road contractors, are behind this dismal state of affairs in the PMPML. They have seen to it that the public transport system remains in shambles, to create scope for the growth of the automobile sector and the construction of more and more roads and flyovers.

Just a small tax of Rs.2000 on each car in the city can generate more than Rs.700 crores for the exchequer. The budget of the public transport system in the city is just Rs.400 crores. Which means that the city bus service can be made entirely free with just this small tax on the car owners. The political will to do this is the crucial factor that is missing. Considering the strength of the vested interests bent upon sabotaging the development of a good and cheap public transport system in the city, it will take immense public pressure to reverse the policies.

Conclusion

Nature will not give us another chance. There is no choice left for Humanity, but to stop burning of fossil fuels, NOW! Among other measures, this demands big investments from the governments of the world in improving the public transport and imposing restrictions on use of private vehicles. Considering the urgency of the problem of global warming, if we don't take these measures today, tomorrow will be too late.



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Change the System - Not the Climate!

Norm Dixon

Green Left Weekly, 26 January 2007

Al Gore's film *An Inconvenient Truth* has helped dramatise the enormity of the global environmental crisis. The scale of the threat posed by industrially induced global warming, and the short time in which to take meaningful action to prevent catastrophic consequences, makes the question of how to combat global warming arguably the most urgent one facing humanity.

Globally, the 10 hottest years on record have been in the past 12 years. The atmospheric concentration of greenhouse gases – primarily carbon dioxide (CO₂) from the burning of fossil fuels, as well as methane, nitrous oxides, water vapour and other gases – is rapidly rising. These gases trap heat and cause warming.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) warned that unless CO₂ levels are stabilised at around twice the pre-industrial level, the Earth's average atmospheric temperature will rise by up to 5.8°C by 2100. To keep warming to below 2°C, at which it is hoped the worst effects could be avoided, the IPCC recommended that human-generated greenhouse gas emissions be slashed by at least 60-80% by 2050 at the latest.

If greenhouse gas emissions are not reduced, sea-levels are forecast to rise between 20 centimetres and one metre by 2100, flooding some of the world's most densely populated cities. Global warming will trigger severe storms and floods, worse droughts and expanding deserts, severe shortages of fresh water and increased epidemics of dangerous tropical diseases. The world's impoverished majority will, and already are, bearing the brunt.

Radical British columnist George Monbiot convincingly argues that the more accurate target for emission cuts by the advanced industrialised countries should be an average of 90% by 2030. For the United States and Australia he urges a 94% cut.

The price of prolonged inaction could be catastrophic. If the Greenland and West Antarctic ice sheets collapse, sea levels could rise by up to 10 metres; more moderate melting could slow or shut down the circulation of ocean currents responsible for the relatively mild temperatures of Northern Europe.

More recent studies reveal that warming could cause the abrupt release of large quantities of methane – a greenhouse gas 21 times more powerful than CO₂ – stored in the frozen but thawing tundra.

Fiddling while Rome burns

Yet as the scientific warnings have multiplied and become louder, governments' response has been to opt for inadequate, voluntary, gradual measures that will cost big business as little as possible.

While scientists began warning of global warming in the 1980s, it was not until December 1997 that an international treaty, the Kyoto Protocol, was finally agreed. The US, which emits 25% of the total industrial greenhouse gases, and Australia refuse to ratify the protocol.

Under the protocol the rich industrialised countries, the major emitters, are required to cut their average emissions by only 5.2% below 1990 levels. They have until 2012 to achieve this. There are no reduction targets or timetables for beyond 2012.

Figures released in October 2006 show that since 1990 annual greenhouse gas emissions from the richest countries have risen and, adjusted for the paper reductions following the collapse of the Eastern European economies, were more than 11% greater in 2004. Of the 41 richest Kyoto ratifiers, 34 had increased emissions between 1990 and 2004. US emissions are up 21.1%, Australia's by 25.1%. Emissions from transportation jumped 24%.

The World Meteorological Organisation reported last November that CO₂ concentration increased to 379.1 parts per million (ppm) in 2005. To keep global warming to 2°C, CO₂ concentration must be stabilised at around 450 ppm by 2050.

Gore focuses on individual actions, makes few serious demands on big business and endorses the largely voluntary market-based measures, such as emissions trading, that are contained in Kyoto. He, like most mainstream environmental groups and the major Green parties, places the onus of solving global warming onto individuals, while relying on the capitalist market, nudged along by so-called "green" taxes and legislative regulations.

Such views reflect a well-meaning but utopian belief that if enough of us decide to drastically reduce our demand on the world's resources, big business and governments will respond to "market signals" and adapt to a slow-growth or no-growth economy.

It is a good thing to organise our lives to live more ecologically. But that alone will not be enough to halt the crisis. It certainly cannot be the

main strategy as it will let the real culprits off the hook and divert precious activist energy away from challenging the underlying systemic dynamic driving ecological degradation.

What is required is the rapid, far-reaching reorganisation of industry, energy, transport and mass consumption patterns, and the massive transfer of clean technology to the Third World. This is simply not possible under capitalism.

As Marxist ecologist John Bellamy Foster explained in *Monthly Review* in 1995, behind most appeals for individual "ecological morality", "there lies the presumption that we live in a society where the morality of the individual is the key to the morality of society. If people as individuals could simply change their moral stance with respect to nature and alter their behaviour in areas such as propagation, consumption, and the conduct of business, all would be well. What is all too often overlooked in such calls for moral transformation is the central institutional fact of our [capitalist] society: what might be called the global 'treadmill of production'."

Foster draws from the scientific socialist analysis of capitalism, first made by Karl Marx and Frederick Engels, to illustrate how, despite the assertions of many environment movement theorists, Marxism not only provides essential insights into the fundamental cause of the environment crisis, but also offers the best political guide to its solution.

Consumption and profits

Under the capitalist mode of production, the capitalist buys or produces commodities in order to sell them for a profit, and then buys or produces more to sell more again. There is no end to the process because capitalists' aim is to reinvest the surplus, or accumulate the capital, from the previous cycle. Competition between capitalists ensures that each one must continue to reinvest their "earnings", increase their production of commodities and continue to expand. Production tends to expand exponentially until interrupted by crises (depressions and wars). It is this dynamic at the core of capitalism that places unsustainable pressure on the environment.

Because capitalism pursues accumulation and growth for its own sake, whatever the consequences, schemes based on the hope of a no-growth, slow-growth or sustainable-growth form of capitalism are pipe dreams, as are strategies based on a critical mass of individual consumers deciding to go "green".

Since the days of Adam Smith, economists have conceded that capitalism is a system devoted to the pursuit of individual wealth, which only indirectly meets society's broader needs. But, as is becoming increasingly clear, the first goal entirely overrides and corrupts the second.

For capitalists, profit is an end in itself. It does not matter whether the commodities they produce satisfy fundamental human needs or are devoted to pointless or ostentatious consumption, or are even destructive. A buck is a buck whether it comes from mung beans, Lamborghinis or cigarettes.

People are not "consumers" by nature. A multi-billion-dollar industry – advertising – constantly plays with our minds to convince us that happiness comes only through buying more and more. In 2003 alone, US big business spent more than US\$54.5 billion on advertising to convince people to constantly consume more goods and services, compared to \$76 billion spent on education.

Many argue that with the right mix of taxes, incentives and regulations everybody would win: big business will have cheaper, more efficient production and therefore be more profitable, and consumers will have more environment-friendly products and energy sources. They argue that in a rational society, such innovations would lower the overall environmental impact.

Unfortunately, we don't live in a rational society.

Capitalism approaches technology – in the production process and in the final product to be sold – in the same way as everything else: what will generate the most profits? Whether it is efficient, clean, safe or environmentally benign has little to do with it.

The technologies that could tackle global warming have long existed. Despite being massively underfunded, renewable energy sources are today competitive with coal and nuclear power (if the negative social and environmental costs are factored in). Public transport systems have been around since the late 1800s, yet huge private interests have ensured that the vastly more wasteful, inefficient and polluting private motor vehicle dominates the industrialised world.

US Marxist economist Paul Sweezy describes how the "automobile-industrialisation complex" – the major car companies, the oil industry, the steel, glass and rubber corporations, the highway builders, the trucking combines, and the real-estate and construction interests tied to suburban sprawl – have been the axis "around which [capital] accumulation in the 20th Century largely turned". This remains at the heart of the major economies' dependence on oil.

Fundamental to capitalism's development has been its power to shift the cost of its ecological and social vandalism onto society as whole. It does this by using the biosphere as a giant toilet: it's cheaper to pour toxic waste into the air or the nearest river, rather than pay for the real costs of production.

Society subsidises corporate profit-making by cleaning up some of the mess or suffering the environmental and/or health costs. In August, a Dutch company with revenues of \$28 billion last year dumped 500 tonnes of toxic waste in the Ivory Coast, West Africa, because it did not want to pay the \$250,000 disposal fee in the Netherlands. At least 10 people died from the fumes, 69 were hospitalised and more than 100,000 needed medical attention.

At the same time, the systematic polluting has been magnified by the development of synthetic chemicals associated with the growth of the petrochemical and agribusinesses. The result is much more toxic wastes, such as those from chlorine-related (organochlorine) production, the source of DDT, dioxin, PCBs and CFCs. The degree of toxicity associated with a given level of production has risen steadily since the middle of last century.

There is no natural feedback mechanism that triggers the market to rein in this sort of vandalism. Attempts to manage the damage by "regulating" capitalism with "green taxes" have had limited success, precisely because governments are run by corporate-funded political parties and politicians, with bureaucracies headed by establishment figures who see their role as defending the status quo.

Tax rates, charges or fines are set well below the level that would impact seriously on profits; more often than not it is cheaper for big business to go on polluting until the next scheduled refit than to immediately stop polluting. Taxes also tend to be set at rates that can be passed on to consumers rather than a level that forces a fundamental redirection of investment into non-polluting or renewable technology.

Taking control

A plethora of "blueprints" for an ecologically sustainable world fail, not because their proposals for a rapid conversion to renewable energy and the rational reorganisation of production and consumption are far-fetched, but because they do not accept that capitalism is incapable of bringing them into being.

A socialist society run by and for the "associated producers", as Marx described working people, would allow the controlling levers of the "treadmill" to be seized, bringing it to a halt so we can all get off and begin to rationally plan the best way forward.

Just a fraction of what is spent on global direct military spending – more than US\$1 trillion a year, of which the US accounts for almost 50% – could eliminate starvation and malnutrition globally, provide education for every child, access to water and sanitation, and reverse the spread of AIDS and malaria. It would also enable the massive transfer of new and clean technologies to the Third World to allow poor countries to skip the dirty industrial stage of development.

The end of capitalist domination would also end the plunder of the Third World, and genuine development could ensue. With the cancellation of Third World debt, the poor countries would retain vast sums to kick-start their clean development.

The wealth of the former capitalist class would also provide immense resources. According to a November 2006 United Nations report, the richest 2% of adults own more than half of all global wealth. The poorest 50% of the world's population own barely 1%. Europe, the US and Japan account for most of the extremely wealthy.

Genuinely democratic socialist planning could collectively redirect society's wealth into research and development of existing and new technologies to meet society's needs, while operating well within the environment's capacity to absorb the waste. We could rapidly bring forward the expansion of renewable energy, and speedily phase out coal and nuclear power stations.

With a huge boost to socially directed investment in research and development, reliable solar energy and wind power could soon become much cheaper than traditional sources. We could begin to harness the Sun's energy, which every day delivers to the Earth 17,000 times as much energy as the entire population uses.

Capitalism's dependence on the private car and truck would begin to be reversed with the rapid proliferation of mass, free public transport systems. In time, cities will no longer be designed around the private car, but around residential, community and work hubs linked by efficient public transport.

In a society that is organised to work together to produce enough to comfortably ensure people's physical and mental well-being and social security, and in which technological advances benefit everybody without costing the environment, a new social definition of wealth will evolve. In the words of Marx and Engels, it will be defined by the degree to which it provides the means for "all members of society to develop, maintain and exert their capacities in all possible directions" so that "the old bourgeois society, with its classes and class antagonisms", is replaced

"by an association [society] in which the free development of each is a condition of the free development of all".

As society's total disposable time expands, so too does the ability of its members to increasingly participate in running, planning and solving its problems. Lifelong theoretical and practical education, made possible by the expanding disposable time, Marx said, will "convert science from an instrument of class rule into a popular force".

[Abridged from a presentation to the Democratic Socialist Perspective's Socialist Summer School in Sydney, January 4-8.]



Norm Dixon writes regularly for *Green Left Weekly*, Australia's radical newsweekly.

For the last 10,000 years we have been living in a remarkably stable climate that has allowed the whole of human development to take place ... Now we see the potential for sudden changes of between 2 and 6 degrees Celsius [by the end of this century] . We just don't know what the world is like at those temperatures. We are climbing rapidly out of mankind's safe zone into new territory, and we have no idea if we can live in it.

Robert Corell, chairman of
the 'Arctic Climate Change Impact Assessment'

Cuba's Green Revolution: Threat of a Good Example

Zoe Kenny

Green Left Weekly, 16 February 2007

The World Wide Fund for Nature (WWF) and Global Footprint Network's 2006 report, *Living Planet*, released last October, painted a grim picture of the calamitous state of the world's environment. It warned that human activities are outstripping the natural world's capacity to regenerate. While, predictably, the report noted that the worst offenders are also the wealthiest – for example the US, Canada, the European Union, Japan, Australia and New Zealand produce 50% of carbon dioxide (CO₂) emissions – it also revealed that Cuba was the only country to have achieved sustainable development.

Cuba's rating was based on the fact that it is the only country in the world that has a high level of social development, including good health and education systems, and does not use up more resources than is sustainable. Cuba's achievements are all the more extraordinary because the country, already very poor, has pulled this off despite the five-decade-long US economic blockade.

Since the 1959 revolution, the Cuban government and people have been working towards the protection and regeneration of their natural environment ravaged by centuries of colonialism and imperialism. In 1959, the first reforestation campaign began and, while progress has been slow, continuing efforts have increased forest cover from 14% to 24.3%.

An article in the August 4, 2006 *National Geographic* magazine acknowledged that Cuba's environment is "largely pristine", due to the large amount of land set aside for protection and the numerous international treaties Cuba has signed and abided by. Cuba's coastal areas and mangroves have earned the title of "crown jewel of Caribbean marine biodiversity" because they are an important refuge for hundreds of species of fish and marine animals many of which have been wiped out elsewhere in the Caribbean.

Chemical free agriculture

Arguably Cuba's most famous environmental achievement has been its agricultural sector which is largely organic and free of toxic pesticides and fertilisers.

Not too long ago Cuba's agricultural system resembled that of many other Third World countries where large-scale machinery, petroleum-

based pesticides and fertilisers were deployed in the production of cash crops – in Cuba's case sugar and tobacco – mainly for export markets. While most Third World countries are dependent on Western corporations for production "inputs" and for their markets, Cuba was heavily dependent on the Soviet bloc. The environmental impact on agriculture was as deleterious in Cuba as anywhere else. However, trade conditions were far more favourable than for any poor country at the mercy of the "free market". Cuba received 5.4 times the average world market prices for its sugar and also received petrol as part payment for its sugar, which it sold to gain its only source of foreign exchange. Cuba relied on the Soviet bloc for 80% of all its trade as well as 57% of its food.

As a result, in the 1980s Cuba had achieved a relatively high level of industrialisation and had the best ranking among Latin American countries for the number of doctors per capita, infant mortality and secondary school enrolment.

When the Soviet Union collapsed in 1991, virtually overnight Cuba's economy faced collapse: oil imports dropped by 53%; wheat, rice and other food imports dropped by more than 50% and there was an 80% reduction in the availability of fertilisers and pesticides. Widespread hunger, even starvation, became real threats.

During the early 1990s, Cubans average daily caloric and protein intake was 30% less than the previous decade. Queuing for food rations became a daily reality and the average Cuban lost nine kilos. Blackouts were frequent and transportation was impeded by lack of fuel. Around the same time the US tightened its economic blockade, the aim being to encourage a rebellion against the government.

Sustainable agriculture

In 1991, the Cuban government announced the Special Period in Peacetime which put the country on a "wartime economy" austerity drive. Following a nationwide discussion, involving millions of Cubans, it was decided to convert the high input agriculture to low input, self-reliant farming practices. While the withdrawal of aid from the Soviet Union was the immediate impetus for this move, Cuba's rapid adaptation to the new conditions was only possible because of its investment in human resources.

With just 2% of the population of Latin America, Cuba has a disproportionate 11% of its scientists. Young scientists in the agricultural ministry and the universities, influenced by the growing ecology movement in the West and the "rectification period" which critically examined the

Soviet influence, already had a critique of the inherited agricultural practices. The special period allowed these younger, more radical, scientists to promote alternative farming and land use methods.

Biofertilisers, such as compost, and the use of vermicomposting (worm farms) replaced chemical fertilisers, unique biopesticides and the specialised use of pests to combat crop-attacking pests replaced synthetic pesticides and oxen replaced tractors. The immediate effect of these changes was the shifting away from the huge state farms (which had previously produced 80% of output) where production had stagnated, to small-scale farming. Farmers rapidly and efficiently adapted, and boosted their production. They also augmented the new techniques with traditional ones such as inter-cropping – growing two crops together that benefit each other by warding off particular pests.

The large state farms had proven inflexible to change, partly because farm workers lacked the knowledge required to master organic farming. In response, the government launched a program to brake up the state farms into cooperatives allowing farmers to sell their remaining produce once the state quotas were fulfilled.

Food shortages and incentives led to a massive increase in small-scale farming. By 1998, in and around Havana alone, there were 8000 urban farms and gardens run by 30,000 people. In 2002, urban gardens produced 3.2 million tonnes of food supplying at least 50% of all vegetables in Havana and between 80-100% of vegetables in smaller cities.

Across the country more than 200,000 people are employed in the agriculture sector. Some 200 biopesticide centres also sell tools, seeds and compost. In 2003, the agriculture ministry was using less than 50% of the diesel fuel, and less than 10% of the chemical fertilisers and synthetic pesticides that it used in 1989.

Energy revolution

The halving of its oil imports during the special period also contributed to a growing awareness of energy conservation, and led to government initiatives in renewable energy and energy efficiency.

Cuba has developed its own photovoltaic solar panel manufacturing. Solar power is being used to provide electricity to off-grid rural areas, including several hundred hospitals and community centres and more than 2000 schools. There are plans to electrify 100,000 rural homes.

During peak sugar harvesting season, energy from bagasse (a sugar byproduct) supplies 30% of Cuba's energy. Transportation was also made

more energy-efficient with the government subsidising and encouraging people to use bicycles and public transport.

Last year was declared the year of the “energy revolution”. Some 30,000 young people were mobilised in a country-wide campaign to install 9 million energy efficient light bulbs and replace millions of obsolete electrical appliances with low energy appliances. Major works have been undertaken to ensure energy security by upgrading existing electricity stations and building stand-alone generators. By mid- 2006 the blackout problem had been solved. Research is also being undertaken on other renewable energy sources such as wind, thermo-oceanic and biomass.

At a time when the threat of global warming clouds humanity's future, Cuba's example shows what is possible given the political will even in a poor country. Unfortunately Cuba's achievements have been largely ignored by the corporate media and Western politicians. In 2001, Project Censored ran the story of Cuba's sustainable agriculture on its “Top 25 Censored Stories List”. Even the WWF report's findings were barely reported.

This is because Cuba's organic agriculture represents a threat by example to the interests of the multi-billion dollar agro-business complex. Giant corporations, such as Monsanto, perpetuate the myth that poor countries would be unable to feed themselves or maintain export crops without the corporations' products. A deadly cycle of dependence is created as the fertilisers and pesticides that produce short-term high yields also severely deplete the soil and increase pesticide resistance in pests, necessitating ever greater amount of inputs and increasing expenditure.

Genetically modified products, such as “terminator seeds” which do not regenerate, increase this dependence. Meanwhile, the price of farm products on the world market is continually decreasing, mainly due to the huge subsidies the rich countries devote to their farm sectors. Cuba's example shows that poor countries can achieve food sovereignty without corporations' interference.

Socialist Cuba shows what is possible when society's resources are controlled by, and in the service of, society as a whole rather than the profit-hungry corporate elites.



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