United Nations Framework Convention on Climate Change (1992)

Understanding Climate Change: A Beginner's Guide to the UN Framework Convention
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Introduction

The 1990s have been a time of international soul- searching about the environment. What are we doing to our planet? More and more, we are realising that the Industrial Revolution has changed forever the relationship between humanity and nature. There is real concern that by the middle or the end of the next century human activities will have changed the basic conditions that have allowed life to thrive on earth.

The 1992 United Nations Framework Convention on Climate Change is one of a series of recent agreements through which countries around the world are banding together to meet this challenge. Other treaties deal with such matters as pollution of the oceans, expanding deserts, damage to the ozone layer, and the rapid extinction of plant and animal species. The Climate Change Convention focuses on something particularly disturbing: we are changing the way energy from the sun interacts with and escapes from our planet's atmosphere. By doing that, we risk altering the global climate. Among the expected consequences are an increase in the average temperature of the earth's surface and shifts in world-wide weather patterns. Other — unforeseen — effects cannot be ruled out.

We have a few problems to face up to.

Problem No. 1 (the big problem): Scientists see a real risk that the climate will change rapidly and dramatically over the coming decades and centuries. Can we handle it?

A giant asteroid did hit the earth — about 65 million years ago. Splat. Scientists speculate that the collision threw so much dust into the atmosphere that the world was dark for three years. Sunlight was greatly reduced, so many plants could not grow, temperatures fell, the food chain collapsed, and many species, including the largest ever to walk the earth, died off.

That, at least, is the prevailing theory of why the dinosaurs became extinct. Even those who weren't actually hit by the asteroid paid the ultimate price.

The catastrophe that befell the dinosaurs is only one illustration, if dramatic, of how changes in climate can make or break a species.

According to another theory, human beings evolved when a drying trend some 10 million years ago was followed around three million years ago by a sharp drop in world temperature. The ape-like higher primates in the Great Rift Valley of Africa were used to sheltering in trees, but, under this long-term climate shift, the trees were replaced with grassland. The 'apes' found themselves on an empty plain much colder and drier than what they were used to, and extremely vulnerable to predators.

Extinction was a real possibility, and the primates appear to have responded with two evolutionary jumps — first to creatures who could walk upright over long distances, with hands free for carrying children and food; and then to creatures with much larger brains, who used tools and were omnivorous (could eat both plants and meat). This second, large-brained creature is generally considered to be the first human.

Shifts in climate have shaped human destiny ever since, and people have largely responded by adapting, migrating, and growing smarter. During a later series of ice ages, sea levels dropped and humans moved across land bridges from Asia to the Americas and the Pacific islands. Many subsequent migrations, many innovations, many catastrophes have followed. Some can be traced to smaller climatic

fluctuations, such as a few decades or centuries of slightly higher or lower temperatures, or extended droughts. Best known is the Little Ice Age that struck Europe in the early Middle Ages, bringing famines, uprisings, and the withdrawal of northern colonies in Iceland and Greenland. People have suffered under the whims of climate for millennia, responding with their wits, unable to influence these large events.

Until now. Ironically, we humans have been so remarkably successful as a species that we may have backed ourselves into a corner. Our numbers have grown to the point where we have less room for large-scale migration should a major climate shift call for it. And the products of our large brains — our industries, transport, and other activities — have led to something unheard of in the past. Previously the global climate changed human beings. Now human beings seem to be changing the global climate. The results are uncertain, but if current predictions prove correct, the climatic changes over the coming century will be larger than any since the dawn of human civilisation.

The principal change to date is in the earth's atmosphere. The giant asteroid that felled the dinosaurs threw large clouds of dust into the air, but we are causing something just as profound if more subtle. We have changed, and are continuing to change, the balance of gases that form the atmosphere. This is especially true of such key 'greenhouse gases' as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). (Water vapour is the most important greenhouse gas, but human activities do not affect it directly.) These naturally occurring gases make up less than one tenth of one per cent of the total atmosphere, which consists mostly of oxygen (21 per cent) and nitrogen (78 per cent). But greenhouse gases are vital because they act like a blanket around the earth. Without this natural blanket the earth's surface would be some 30 C colder than it is today.

The problem is that human activity is making the blanket 'thicker'. For example, when we burn coal, oil, and natural gas we spew huge amounts of carbon dioxide into the air. When we destroy forests the carbon stored in the trees escapes to the atmosphere. Other basic activities, such as raising cattle and planting rice, emit methane, nitrous oxide, and other greenhouse gases. If emissions continue to grow at current rates, it is almost certain that atmospheric levels of carbon dioxide will double from pre-industrial levels during the 21st century. If no steps are taken to slow greenhouse gas emissions, it is quite possible that levels will triple by the year 2100.

The most direct result, says the scientific consensus, is likely to be a 'global warming' of 1.5 to 4.5 C over the next 100 years. That is in addition to an apparent temperature increase of half a degree Centigrade since the pre-industrial period before 1850, at least some of which may be due to past greenhouse gas emissions.

Just how this would affect us is hard to predict because the global climate is a very complicated system. If one key aspect — such as the average global temperature — is altered, the ramifications ripple outward. Uncertain effects pile onto uncertain effects. For example, wind and rainfall patterns that have prevailed for hundreds or thousands of years, and on which millions of people depend, may change. Sea-levels may rise and threaten islands and low-lying coastal areas. In a world that is increasingly crowded and under stress — a world that has enough problems already — these extra pressures could lead directly to more famines and other catastrophes.

While scientists are scrambling to understand more clearly the effects of our greenhouse gas emissions, countries around the globe recently joined together to confront the problem.

How the Convention responds

— It recognises that there is a problem. That's a significant step. It is not easy for the nations of the world to agree on a common course of action, especially one that tackles a problem whose consequences are uncertain and which will be more important for our grandchildren than for the present generation. Still, the Convention was negotiated and signed by 165 states in a little over two years, and

over 100 have already ratified and so are legally bound by it. The treaty took effect on 21 March 1994.

— It sets an 'ultimate objective' of stabilising 'greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system.' The objective does not specify what these concentrations should be, only that they be at a level that is not dangerous. This acknowledges that there is currently no scientific certainty about what a dangerous level would be. Scientists believe it will take about another decade (and the next generation of supercomputers) before today's uncertainties (or many of them) are significantly reduced. The Convention's objective thus remains meaningful no matter how the science evolves.

— It directs that 'such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.' This highlights the main concerns about food production — probably the most climate-sensitive human activity — and economic development. It also suggests (as most climatologists believe) that some change is inevitable and that adaptive as well as preventive measures are called for.

Again, this leaves room for interpretation in the light of scientific findings and the trade-offs and risks that the global community is willing to accept.

Problem No. 2: If the consequences of a problem are uncertain, do you ignore the problem or do you do something about it anyway?

Climate change is a threat to mankind. But no one is certain about its future effects or their severity. Responding to the threat is expected to be expensive, complicated, and difficult. There is even some disagreement over whether any problem exists at all: while many people worry that the effects will be extremely serious, others argue that scientists cannot prove that what they suspect will happen will actually happen. In addition, it is not clear who (in the various regions of the world) will suffer most. Yet if the nations of the world wait until the consequences and victims are clear, it will probably be too late to act. What should we do?

The truth is that in most scientific circles the issue is no longer whether or not climate change is a potentially serious problem. Rather, it is how the problem will develop, what its effects will be, and how these effects can best be detected. Computer models of something as complicated as the planet's climate system are not far enough advanced yet to give clear and unambiguous answers. Nevertheless, while the when, where, and how remain uncertain, the big picture painted by these climate models cries out for attention.

For example:

— Regional rain patterns may change. At the global level, the evapo-transpiration cycle is expected to speed up. This means that it would rain more, but the rain would evaporate faster, leaving soils drier during critical parts of the growing season. New or worsening droughts, especially in poorer countries, could reduce supplies of clean, fresh water to the point where there are major threats to public health. Because they still lack confidence in regional scenarios, scientists are uncertain about which areas of the world risk becoming wetter and which drier. But with global water resources already under severe strain from rapid population growth and expanding economic activity, the danger is clear.

— Climate and agricultural zones may shift towards the poles. In the mid-latitude regions the shift is expected to be 200 to 300 kilometres for every degree Celsius of warming. Increased summer dryness may reduce mid- latitude crop yields by 10 to 30 per cent, and it is possible that today's leading grain-producing areas (such as the Great Plains of the United States) would experience more frequent droughts and heat waves. The poleward edges of the mid-latitude agricultural zones — northern Canada, Scandinavia, Russia, and Japan in the northern hemisphere, and southern Chile and Argentina in the southern hemisphere — might benefit from higher temperatures. However, in some areas rugged

terrain and poor soil would prevent these countries from compensating for reduced yields in today's more productive areas.

— Melting glaciers and the thermal expansion of sea water may raise sea levels, threatening low-lying coastal areas and small islands. The global mean sea level has already risen by around 15 centimetres during the past century, and global warming is expected to cause a further rise of about 18 cm by the year 2030. If the current trend in greenhouse gas emissions continues, the rise could amount to 65 cm above current levels by the year 2100. The most vulnerable land would be the unprotected, densely populated coastal regions of some of the world's poorest countries. Bangladesh, whose coast is already prone to devastating floods, would be a likely victim, as would many small island states such as the Maldives.

These scenarios are alarming enough to raise concern, but too uncertain to enable governments to make many specific decisions about what to do. The picture is fuzzy. Some governments, beleaguered by other problems and responsibilities and bills to pay, understandably are tempted to do nothing at all. Maybe the threat will go away. Or someone else will deal with it. Maybe another giant asteroid will hit the earth. Who knows?

How the Convention responds

— It establishes a framework and a process for agreeing to specific actions — later. The diplomats who wrote the Framework Convention on Climate Change saw it as a launching pad for potential further action in the future. They recognised that it would not be possible in the year 1992 for the world's governments to agree on a detailed blueprint for tackling climate change. But by establishing a framework of general principles and institutions, and by setting up a process through which governments can meet regularly, they got things started.

A key benefit of this approach is that it allows countries to begin discussing an issue even before they all fully agree that it is, in fact, a problem. Even sceptical countries feel it is worthwhile participating. (Or, to put it another way, they'd feel uneasy about being left out.) This creates legitimacy for the issue, and a sort of international peer pressure to take the subject seriously.

The Convention is designed to allow countries to weaken or strengthen the treaty in response to new scientific developments. For example, they can agree to take more specific actions (such as reducing emissions of greenhouse gases by a certain amount) by adopting 'amendments' or 'protocols' to the Convention.

The treaty promotes action in spite of uncertainty on the basis of a recent development in international law and diplomacy called the 'precautionary principle.' Under traditional international law, an activity generally has not been restricted or prohibited unless a direct causal link between the activity and a particular damage can be shown. But many environmental problems, such as damage to the ozone layer and pollution of the oceans, cannot be confronted if final proof of cause and effect is required. In response, the international community has gradually come to accept the precautionary principle, under which activities that threaten serious or irreversible damage can be restricted or even prohibited before there is absolute scientific certainty about their effects.

— The Convention takes preliminary steps that clearly make sense for the time being. Countries ratifying the Convention — called 'Parties to the Convention' in diplomatic jargon — agree to take climate change into account in such matters as agriculture, energy, natural resources, and activities involving sea-coasts. They agree to develop national programmes to slow climate change. The Convention encourages them to share technology and to cooperate in other ways to reduce greenhouse gas emissions, especially from energy, transport, industry, agriculture, forestry, and waste management, which together produce nearly all greenhouse gas emissions attributable to human activity.

— The Convention encourages scientific research on climate change. It calls for data gather-

ing, research, and climate observation, and it creates a 'subsidiary body' for 'scientific and technological advice' to help governments decide what to do next. Each country that is a Party to the Convention must also develop a greenhouse gas 'inventory' listing its national sources (such as factories and transport) and 'sinks' (forests and other natural ecosystems that absorb greenhouse gases from the atmosphere). These inventories will have to be updated regularly and made public. The information they provide on which activities emit how much of each gas will be essential for monitoring changes in emissions and determining the effects of measures taken to control emissions.

Problem No. 3: It's not fair.

If a giant asteroid hits the earth, that's nobody's fault. The same cannot be said for global warming.

There is a fundamental unfairness to the climate change problem that chafes at the already uneasy relations between the rich and poor nations of the world. Countries with high standards of living are mostly (if unwittingly) responsible for the rise in greenhouse gases. These early industrialisers — Europe, North America, Japan, and a few others — created their wealth in part by pumping into the atmosphere vast amounts of greenhouse gases long before the likely consequences were understood. Developing countries now fear being told that they should curtail their own fledgling industrial activities — that the atmosphere's safety margin is all used up.

Because energy-related emissions are the leading cause of climate change, there will be growing pressure on all countries to reduce the amounts of coal and oil they use. There also will be pressure (and incentives) to adopt advanced technologies so that less damage is inflicted in the future. Buying such technologies can be costly.

Countries in the early stages of industrialisation — countries struggling hard to give their citizens better lives — don't want these additional burdens. Economic development is difficult enough already. If they agreed to cut back on burning the fossil fuels that are the cheapest, most convenient, and most useful for industry, how could they make any progress?

There are other injustices to the climate change problem. The countries to suffer the most if the predicted consequences come about — if agricultural zones shift or sea levels rise or rainfall patterns change — will probably be in the developing world. These nations simply do not have the scientific or economic resources, or the social safety nets, to cope with disruptions in climate. Also, in many of these countries rapid population growth has pushed many millions of people onto marginal land — the sort of land that can change most drastically due to variations in climate.

How the Convention responds

— It puts the lion's share of the responsibility for battling climate change — and the lion's share of the bill — on the rich countries. The Convention notes that the largest share of historical and current emissions originates in developed countries. Its first basic principle is that these countries should take the lead in combating climate change and its adverse impacts. Specific commitments in the treaty relating to financial and technological transfers apply only to the 24 developed countries belonging to the Organisation for Economic Cooperation and Development (OECD — excepting Mexico, which joined the OECD in 1994). They agree to support climate change activities in developing countries by providing financial support above and beyond any financial assistance they already provide to these countries.

Specific commitments concerning efforts to limit greenhouse gas emissions and enhance natural sinks apply to the OECD countries as well as to 12 'economies in transition' (Central and Eastern Europe and the former Soviet Union). Although negotiations left the treaty language less than clear, it is generally accepted that the OECD and transition countries should at a minimum seek to return by

the year 2000 to the greenhouse gas emission levels they had in 1990.

— The Convention recognises that poorer nations have a right to economic development. It notes that the share of global emissions of greenhouse gases originating in developing countries will grow as these countries expand their industries to improve social and economic conditions for their citizens.

— It acknowledges the vulnerability of poorer countries to the effects of climate change. One of the Convention's basic principles is that the specific needs and circumstances of developing countries should be given 'full consideration' in any actions taken. This applies in particular to those whose fragile ecosystems are highly vulnerable to the impacts of climate change. The Convention also recognises that states which depend on income from coal and oil would face difficulties if energy demand changes.

Problem No. 4: If the whole world starts consuming more and living the good life, can the planet stand the strain?

As the human population continues to grow, the demands human beings place on the environment increase. The demands are becoming all the greater because these rapidly increasing numbers of people also want to live better lives. More and better food, more and cleaner water, more electricity, refrigerators, automobiles, houses and apartments, land on which to put houses and apartments . . .

Already there are severe problems supplying enough fresh water to the world's billions. Burgeoning populations are draining the water from rivers and lakes, and vast underground aquifers are steadily being depleted. What will people do when these natural 'tanks' are empty? There are also problems growing and distributing enough food — widespread hunger in many parts of the world attests to that. There are other danger signals. The global fish harvest has declined sharply; as large as the oceans are, the most valuable species have been effectively fished out.

Global warming is a particularly ominous example of humanity's insatiable appetite for natural resources. During the last century we have dug up and burned massive stores of coal, oil, and natural gas that took millions of years to accumulate. Our ability to burn up fossil fuels at a rate that is much, much faster than the rate at which they were created has upset the natural balance of the carbon cycle. The threat of climate change arises because one of the only ways the atmosphere — also a natural resource — can respond to the vast quantities of carbon being liberated from beneath the earth's surface is to warm up.

Meanwhile, human expectations are not tapering off. They are increasing. The countries of the industrialised 'North' have 20 per cent of the world's people but use about 80 per cent of the world's resources. By global standards, they live extremely well. It's nice living the good life, but if everyone consumed as much as the North Americans and Western Europeans consume — and billions of people aspire to do just that — there probably would not be enough clean water and other vital natural resources to go around. How will we meet these growing expectations when the world is already under so much stress?

How the Convention responds

— It supports the concept of 'sustainable development.' Somehow, mankind must learn how to alleviate poverty for huge and growing numbers of people without destroying the natural environment on which all human life depends. Somehow a way has to be found to develop economically in a fashion that is sustainable over a long period of time. The buzzword for this challenge among environmentalists and international bureaucrats is 'sustainable development'. The trick will be to find methods for living well while using critical natural resources at a rate no faster than that at which they are replaced. Unfortunately, the international community is a lot farther along in defining the problems posed by sustainable development than it is in figuring out how to solve them.

— The Convention calls for developing and sharing environmentally sound technologies and know-how. Technology will clearly play a major role in dealing with climate change. If we can find practical ways to use cleaner sources of energy, such as solar power, we can reduce the consumption of coal and oil. Technology can make industrial processes more efficient, water purification more viable, and agriculture more productive for the same amount of resources invested. Such technology must be made widely available — it must somehow be shared by richer and more scientifically advanced countries with poorer countries that have great need of it.

— The Convention emphasises the need to educate people about climate change. Today's children and future generations must learn to look at the world in a different way than it has been looked at by most people during the 20th century. This is both an old and a new idea. Many (but not all!) pre-industrial cultures lived in balance with nature. Now scientific research is telling us to do much the same thing. Economic development is no longer a case of 'bigger is better' — bigger cars, bigger houses, bigger harvests of fish, bigger doses of oil and coal. We must no longer think of human progress as a matter of imposing ourselves on the natural environment. The world — the climate and all living things — is a closed system; what we do has consequences that eventually come back to affect us. Tomorrow's children — and today's adults, for that matter — will have to learn to think about the effects of their actions on the climate. When they make decisions as members of governments and businesses, and as they go about their private lives, they will have to take the climate into account.

In other words, human behaviour will have to change — probably the sooner the better. But such things are difficult to prescribe and predict. There is, for example, the matter of what sacrifices might have to be made by everyone for the good of the global climate. That leads to...

Problem No. 5: Who has the energy, time, or money left to deal with climate change, when we have so many other problems?

A valid point.

How the Convention responds

— It starts slowly. It doesn't make too many demands (or requests) for the time being. But stay tuned. The Framework Convention on Climate Change is a general treaty with just a few specific requirements. More and bigger requirements may come later, in the form of amendments and protocols. This will happen as scientific understanding of climate change becomes clearer and as the countries of the world, already suffering from a case of 'disaster fatigue', adjust to the idea that they have yet another crisis to face and pay for. War, famine, AIDS, the ozone 'hole', acid rain, the loss of ecosystems and species ... Thinking about these problems, people could be forgiven for wondering if they should throw in the towel.

We can't give up, of course. And while the Convention cannot claim to have the issue all sorted out, it does make a start. Things are beginning to happen. Developed countries are making national plans with the aim of returning their greenhouse gas emissions to 1990 levels by the year 2000 — thereby reversing the historical trend of ever-increasing emissions. Countries that have ratified the treaty are beginning to gather data on their emissions and on the present climate. More and more, people and governments are talking and thinking about climate change.

What happens next? Step by step, national governments committed to controlling their emissions must begin tightening emissions standards and requiring more replanting of trees; some countries are already working on such standards. Local and urban governments — which often have direct responsibility for transport, housing, waste management, and other greenhouse gas-emitting sectors of the economy — have a role, too. They can start designing and building better public transport systems, for example, and creating incentives for people to use them rather than private automobiles.

They should tighten construction codes so that new houses and office buildings can be heated or cooled with less fuel. Meanwhile, industrial companies need to start shifting to new technologies that use fossil fuels and raw materials more efficiently. Wherever possible they should switch to renewable energy sources such as wind and solar power. They should also redesign products such as refrigerators, automobiles, cement mixes, and fertilisers so that they produce lower greenhouse gas emissions. Farmers should look to technologies and methods that reduce the methane emitted by livestock and rice fields. Individual citizens, too, must cut their use of fossil fuels — take public transport more often, switch off the lights in empty rooms — and be less wasteful of all natural resources.

It may seem naive to expect behavioural changes of this magnitude. But the potential for more responsible behaviour on behalf of the climate is nevertheless there. It is possible that as time passes and more is known about the threats posed by climate change, such responses will seem a lot less naive and a lot more vital to humanity's well-being.

— The Convention is based on sharing the burdens of coping with climate change. This is important. The atmosphere is a shared resource, part of the 'global commons'. The treaty tries to make sure that any sacrifices made in protecting this resource will be shared fairly among countries — in accordance with their 'common but differentiated responsibilities and respective capabilities and their social and economic conditions'. This means, the participating countries hope, that whatever ultimatÄly has to be done will be done by enough participants to make the benefits worth the sacrifices. It is easier to sacrifice towards the common good when you are sure everyone else is pitching in.

Conclusion: Into the 21st century and beyond

Climate change would have lasting consequences. One giant asteroid came along 65 million years ago, and that was it for the dinosaurs.

In facing up to man-made climate change, human beings are going to have to think in terms of decades and centuries. The job is just beginning. Many of the effects of climate shifts will not be apparent for two or three generations. In the future, everyone may be hearing about — and living with — this problem.

The Framework Convention takes this into account. It is aimed at the next century as much as at this one. It establishes institutions to support efforts to carry out long-term commitments and to monitor long-term efforts to minimise — and adjust to — climate change. The Conference of the Parties, in which all states that have ratified the treaty are represented, is the Convention's supreme body. It meets for the first time in March 1995 and on a yearly basis thereafter. It will promote and review the implementation of the Convention and, if appropriate, strengthen it. The Conference of Parties will be assisted by two subsidiary bodies, one for scientific and technological advice and the other for implementation. The Conference of Parties may also make additional arrangements in the future to help support the needs of the Convention.

The treaty also reflects a reasonable view about how the world will function politically in the future, and assumptions about how problems can best be solved over the next century. It is based on a cooperative rather than a confrontational approach — it assumes that countries can successfully tackle problems such as climate change only if they work together as a team. And it is designed to work well in a multi-polar world in which many countries have influence and the power to apply peer pressure to persuade others to uphold their obligations.

How can we strike a balance with the environmental conditions that allow us to exist in the first place? That is a question humankind has largely ignored up to now, at its peril. From here on it is a challenge we probably will have to face as long as our species exists.

What is the greenhouse effect?

In the long term, the earth must shed energy into space at the same rate at which it absorbs energy from the sun. Solar energy arrives in the form of short-wavelength radiation. Some of this radiation is reflected away by the earth's surface and atmosphere. Most of it, however, passes straight through the atmosphere to warm the earth's surface. The earth gets rid of this energy (sends it back out into space) in the form of long- wavelength, infra-red radiation.

Most of the infra-red radiation emitted upwards by the earth's surface is absorbed in the atmosphere by water vapour, carbon dioxide, and the other naturally occurring 'greenhouse gases'. These gases prevent energy from passing directly from the surface out into space. Instead, many interacting processes (including radiation, air currents, evaporation, cloud-formation, and rainfall) transport the energy high into the atmosphere. From there it can radiate into space. This slower, more indirect process is fortunate for us, because if the surface of the earth could radiate energy into space unhindered, the earth would be a cold, lifeless place — a bleak and barren planet rather like Mars.

By increasing the atmosphere's ability to absorb infra-red energy, our greenhouse gas emissions are disturbing the way the climate maintains this balance between incoming and outgoing energy. A doubling of the concentration of long-lived greenhouse gases (which is projected to occur early in the next century) would, if nothing else changed, reduce the rate at which the planet can shed energy into space by about 2 per cent. Energy cannot simply accumulate. The climate somehow will have to adjust to get rid of the extra energy — and while 2 per cent may not sound like much, over the entire earth that amounts to trapping the energy content of some 3 million tons of oil every minute.

Scientists point out that we are altering the energy 'engine' that drives the climate system. Something has to change to absorb the shock.