

Briefing Paper
Plantations Campaign

THE CARBON SHOP: Planting New Problems

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Climate and carbon dioxide

Even the smallest changes in the earth's climate have always made a big difference to human societies. When a volcanic eruption in 535 AD brought about slightly cooler, drier weather, the results included migrations, hunger, the spread of plague, and changes in agriculture –possibly even the collapse of a native American civilization. Five hundred years later, when the climate was warmer, Vikings were able to maintain colonies in Greenland. As the climate turned colder again, ferocious storms drowned scores of towns and villages near the North Sea.

Today climate changes are in the offing which are far more devastating than these or any others in human history. The main cause is a rise in the amount of carbon dioxide in the atmosphere.

The habitability of the planet depends on carbon dioxide levels never falling too low nor rising too high. Without CO₂ and certain other gases, which help trap heat near the earth's surface, the average surface temperature would drop to –6 °C. Too much CO₂, and the oceans would boil. At current levels, the earth's surface stays at a just-right average of 15 °C.

Keeping carbon dioxide levels within reasonable limits is an intricate set of checks and balances in the atmosphere, the ocean, living things, and the earth's crust and mantle. Volcanoes add CO₂ to the atmosphere, while the weathering of silicate rocks –aided by water and the activity of plants– removes it. Living organisms extract CO₂ from the atmosphere, depositing the carbon in their bodies or shells. Some of this carbon is quickly released back into the atmosphere through decay and fire. Carbonates accumulating on the sea floor through weathering and runoff or other processes are eventually pushed under continental plates at ocean edges, finding their way to the atmosphere again in volcanic activity millions of years later. Still more carbon is buried underground in the form of coal and oil. Altogether, the mass of carbon which has accumulated in rocks due to the activity of living organisms is 100,000 times the mass of carbon in the atmosphere. The mass of carbon in living organisms, on the other hand, is only four times that in the atmosphere.

Over the past 150 years, however, and especially since the Second World War, industrial activity has returned large quantities of this formerly safely locked-up carbon to the atmosphere. Before the industrial revolution began there were only around 580 billion tonnes of carbon in the atmosphere as carbon dioxide. Today the figure is more than 750 billion tonnes –the highest in 200,000 years– and another six billion is being added each year. Up to 90 per cent of the increase in CO₂ and other world-warming gases has come from the North.

The world heats up

The effects of this increase are already appearing. Since the end of the last century temperatures have drifted up by 0.6 °C. The 1990s were the hottest decade on record. More and more storms –a byproduct of global warming– are raging around the world. Asian monsoons are becoming less predictable. Unusually extreme droughts and floods are wreaking havoc in China, East Africa, the Middle East, Europe, North America, New Zealand and the Indian subcontinent. Warmer, more CO₂-laden waters are killing coral reefs, which protect coastlines and nurture fisheries. An area of Arctic ice the size of Texas has been lost over the past 20 years, with the ice over the Arctic ocean thinning since the late 1950s from 3.1 to 1.8 metres, while Antarctica's Larsen Ice Shelf A has broken away from the continent.

The future threatens even worse. The surplus carbon dioxide that is already in the atmosphere will continue to wreak its effects for one to two centuries, while still more is added. Sea levels are already set to rise by 50 centimetres by 2100, and if the Western Antarctic ice mass slips into the sea, they could go up six metres. Grain yields are likely to decline dangerously in the South over the next 50 years due to climate-induced soil degradation, floods, droughts and increased pest infestations. Disease-carrying insects such as malarial mosquitoes are poised to spread into new regions. Many

species and ecosystems will disappear, unable to adapt to the pace of change. Millions of “climate refugees” may soon be on the move.

Worst of all are possible runaway effects. Rising temperatures could easily destabilize ice-like methane hydrates on the sea floor or beneath the Arctic tundra, releasing billions of tonnes of methane, a greenhouse gas 20 times more powerful even than CO₂. Rising temperatures could also cause forests to die off rapidly and peatlands to dry out, rapidly turning carbon reservoirs such as Amazon forests into massive carbon dioxide sources. Polar ice-melts, meanwhile, could accelerate warming by reducing the amount of energy reflected from the poles. They could also have a dramatic effect on ocean currents that transport heat around the globe. For example, the Gulf Stream could shut down, plunging Northern Europe into freezing cold at the same time other parts of the world heat up.

The rise in levels of atmospheric carbon dioxide, in short, cannot continue. Adding as little as another 200 billion tonnes will result in a 2-3 °C rise in temperatures –a heat wave unprecedented in human history. Adding 300 or more would be catastrophic, especially in that it might trigger runaway heating effects that could make the planet uninhabitable. Yet more than 4,000 billion tonnes of carbon in fossil fuels is waiting to be recovered and burned, over three-quarters of it coal. It would seem that the vast bulk of this must be left in the ground.

Two approaches to global warming

During the early 1990s, the corporations most responsible for the mining and consumption of fossil fuels denied that the problem of industrial-caused global warming existed or that it was serious enough to require concerted political action. They had a great deal of influence. Climate negotiators from the US –whose CO₂ emissions are roughly equal to those of 135 Southern countries, or three billion people, put together– continually received instructions from industry groups such as the Global Climate Coalition, who spent millions of dollars spreading scientific disinformation.

However, the events of the last few years have made it more difficult to deny that global warming has begun, and nearly impossible to pretend that consumption of remaining reserves of fossil fuels would not lead to disaster.

That leaves only two approaches to the crisis.

One approach is to reduce fossil fuel use dramatically and quickly. That means focusing first on reducing the “luxury” emissions of those who have already used up more than their fair share of global carbon sinks and stocks, while promoting energy conservation and energy efficiency, worldwide use of solar and other renewable energy sources, and ecological instead of industrial agriculture.

The second approach involves speculative programs to modify earth’s biosphere and crust to allow them to absorb more CO₂. Promising to make it «safer» for richer nations and groups to continue rapid, high-level consumption of fossil fuels for as long as possible, this approach enjoys great favour among fossil-fuel producing and consuming industries and many officials in the US and some other Northern governments. The US Department of Energy, for instance, is currently exploring grandiose schemes for intensively “manipulating” terrestrial and ocean ecosystems and the earth’s crust so that they can store three to six times more carbon than at present, in order to make possible “continued large-scale use of fossil fuels”. This general approach –and the appeal to tree plantations in particular– is supported by a wide range of technocrats, brokers, consultants, think tanks, multilateral agencies, forestry companies and even a few non-government organizations (NGOs).

The two approaches are sometimes seen as complementary ways of checking the accumulation of CO₂ in the atmosphere. Yet they could not be more different both in their politics and in their probable effectiveness in abating global warming.

Ecological politics

Consider the question of politics first. Assume that on average, a citizen of the US produces 20 times the amount of carbon dioxide that a citizen of India produces. The US citizen thus puts a far greater burden on the ability of the globe's carbon-cycling mechanisms to keep levels of CO₂ stable. How do the two approaches treat this issue?

The first approach treats inequality as a power imbalance and as a root of the ecological problem. It would move toward equalizing per capita emissions worldwide while contracting overall emissions, without forcing unnecessary hardship on any side. It notes, moreover, that the "carbon debt" that the North owes the South for its historical overuse of the atmosphere is still unpaid.

The second approach, on the other hand, takes unequal impact on the carbon cycle as a given. It assumes that because the rich industrialized countries have historically overused the atmosphere, they have a right to have done so, and to continue doing so. Not only does this approach ignore the history of unequal use of carbon stocks and sinks. It would actually worsen world inequalities in access to resources.

The assumption of the second approach is that any carbon-dioxide emissions are acceptable, no matter how extravagant, as long as they can be compensated for, or "offset", by some activity that absorbs the CO₂. The leading example of such an activity is planting trees, which, through photosynthesis, convert CO₂ into wood carbon. Thus a utility company emitting a million tonnes of carbon dioxide a year can be just as "carbon neutral" as a subsistence farmer emitting one tonne a year –as long as the company plants thousands of trees. The same goes for individual consumers. An organization called Future Forests offers a scheme which allows a British family of "two parents, two children with a car" to be able to claim it is "carbon-neutral" at a cost of a mere US\$420 a year by planting 65 trees a year in Mexico or Britain.

On this view, US citizens' use of 20 times more of the atmosphere than their Indian counterparts entitles them to use 20 times more other resources too: 20 times more tree plantation land, 20 times more "carbon workers" to plant and maintain them, and so forth. In fact, it obligates them to do so.

This "ecological" resource grab is bound to exert new pressures on local land and water rights, particularly in the South, and pass on new risks to people who can ill afford to take them. Global experience with pulpwood or oil palm plantations has demonstrated what happens when well-funded interests take over large land areas to grow trees for a single purpose. Cropland, pastures or gathering grounds are taken over. Water sources and fisheries are frequently damaged, and soils degraded. Local communities are often driven away, very little employment is provided, and local government often becomes less responsive to local people. Ecosystems are simplified, biodiversity devastated, and even native forests supplanted. (See WRM Plantations Campaign Briefings 1 and 2*) There is no evidence to suggest that carbon production or storage plantations would be any different –a frightening prospect given that some proposals have called for plantations to cover an area equivalent to that of Australia. Ironically, the community evicted today by a company drilling oil to feed distant automobiles may find itself displaced again tomorrow– this time by tree plantations intended by the drivers of those automobiles to "offset" the burning of that oil. Instead of reducing the North's ecological footprint, in short, carbon "offset" forestry expands it.

The land and other resources used for carbon forestry, moreover, is to be purchased using cash which has itself been accumulated partly through the history of overexploitation of the atmosphere which has accompanied industrial development: the North's historical "carbon debt" to the South is simply ignored.

If this approach validates and deepens inequalities in the use of resources between the North and the South, it also sanctions inequalities between urban and rural areas within both North and South. It

* 1. Pulpwood plantations: a growing problem. 2. Ten replies to ten lies.

even certifies inequalities within industrialized regions. A corporation that buys carbon-dioxide emission rights in Chicago by sponsoring carbon-“offset” plantations in Costa Rica will be allowed to go on spewing out, along with CO₂, many other pollutants that pose deadly local health risks, such as polycyclic aromatic hydrocarbons and fine particulate matter. As the anti-environmental-racism movement in North America has documented, a disproportionate number of such factories are located in poor communities of colour.

What will work?

The political differences between the two approaches are clear. But how effective are they likely to be in relieving global warming? Here again the contrast is sharp.

The first approach is based on solid science. Thousands of years of experience have demonstrated the effectiveness of keeping hydrocarbons in the ground as a way of moderating CO₂ levels in the atmosphere. According to current scientific consensus, anything more than a doubling of atmospheric CO₂ concentrations over pre-industrial levels –280 parts per million by volume– is likely to cause dangerous climate change. On current trends this will happen by the middle of the century; CO₂ levels already stand at 30 per cent above those of pre-industrial times. Although it is unclear exactly when carbon dioxide concentrations will threaten the habitability of the planet, the strategy of quick and drastic cuts is the approach to the problem that enjoys the most secure theoretical foundation. Ensuring that carbon-dioxide levels do not double will require an emissions reduction of 60 per cent or more from 1990 levels.

In addition, practices that could slash emissions in industrialized countries –and prevent those of Southern countries from rising above a certain level– are fairly well-known. Many techniques of energy conservation and energy efficiency, together with solar and other renewable energy technologies, are either already available or could be developed with the same sort of investment now devoted to nuclear energy or fossil fuel research. What is required is not dazzling new technology so much as a more powerful political movement behind initiatives that already exist.

The second approach, by contrast, is based on science that nearly everyone acknowledges to be uncertain. No one is exactly sure even where the earth’s current carbon “sinks” are, or how they work. For example, no consensus exists today among scientists about how much carbon is moving into and out of temperate forests, or even how to go about finding out. Creating large, reliable new sinks with any degree of confidence would be far more daunting even than solving these recalcitrant puzzles.

Still more difficult would be quantifying the effectiveness of each individual carbon sink separately in compensating for a given amount of industrial emissions. The dream, after all, is that some day rich-country customers who do not wish to cut their carbon dioxide emissions will be able to go into an approved international Carbon Shop and have a precise length of carbon sink measured out for them which will safely “cover” their emissions. This picture betrays a profound lack of appreciation of the obstacles to calculating the results of the intercoupling of ecological, social, geological, political, hydrological, bureaucratic, biochemical, economic, and atmospheric systems.

The technologies for creating new carbon sinks are in themselves unpredictable in their effects, potentially hugely destabilizing, and possibly counterproductive. Today, US and Japanese scientists are conducting experiments to find out whether it might be possible to dissolve billions of tonnes of CO₂ in deep ocean waters; to stimulate algal growth and carbon uptake over hundreds of square kilometres of the Pacific Ocean by fertilizing it with powdered iron; and to inject huge amounts of CO₂ into aquifers or fossil fuel deposits underground. Other recent proposals for sequestering carbon dioxide have included:

- * Firing dry-ice torpedoes deep into the ocean
- * Building cars out of carbon
- * Burying logs or organic waste under the sea floor

- * Seeding large areas of land with organisms genetically engineered to fix carbon “more efficiently” or to produce carbon-containing “bioplastics” resistant to decay
- * Establishing floating kelp farms thousands of square kilometres in size which, growing heavier as they consumed CO₂, would eventually sink to the ocean floor
- * Using fleets of C-130 military transport planes to bomb Scotland and other countries with millions of metal cones containing pine saplings

Even some of the scientists involved find it difficult to keep a straight face when discussing such schemes. In a particularly pregnant under-statement, the US Department of Energy admitted in 1999 that “most possibilities for carbon sequestration involve immature technologies and ideas”.

The tree-plantation “fix”

By comparison, the more familiar technique of using conventional tree plantations to “fix” carbon emissions may seem straightforward and unproblematic. Yet the idea that planting trees is a reasonable justification for postponing emission cuts is based on science which is just as dubious.

The problem is how to calibrate a meaningful and reliable “equivalence” between the carbon sequestered permanently in fossil fuel deposits, the transient CO₂ in the atmosphere, and the carbon sequestered temporarily as a result of any particular tree plantation or national tree-planting programme. No one has any idea how to do this. Nor is it likely they ever will.

It is impossible to predict with the necessary certainty how much carbon any plantation project would remove from the atmosphere, and for how long. Unlike subterranean oil or coal or sea-floor carbonate, carbon stored in live or dead trees or in upper soil layers is “fragile”: it can quickly reenter the atmosphere at any time. Wildfires or human-set conflagrations often rage through plantations. Rates of decay are often difficult to anticipate, since they depend on so many shifting variables. So too are rates of respiration –the process by which trees release CO₂ back into the air when they break down the sugars made during photosynthesis or soil microorganisms break down plant matter. Thus proponents of carbon-“offset” plantations suffered an unexpected setback in October 1999 when a report from the Intergovernmental Panel on Climate Change (IPCC) concluded that as the globe begins to warm and respiration increases faster than CO₂ uptake, such plantations will begin returning most of their carbon to the atmosphere. This means that early in the next century, plantations established today to protect the planet from global warming could well be contributing to it. Even in narrow biochemical terms, according to Will Steffen of Sweden’s Royal Academy of Sciences, chair of the International Geosphere-Biosphere Programme, forestry is an “insecure way of storing carbon out of harm’s way”.

No less difficult to predict are the political strife or legal changes which could lead to a plantation’s being cut down by angry villagers or state officials. Nor can the career of paper and other wood products made from plantation trees be easily tracked. Some may be burned almost immediately; others may decay more slowly; still others may enjoy a somewhat longer life in housing or furniture; and some may be landfilled, which could lead either to long-term sequestration or to dangerous releases of methane, depending on circumstances. The uncertainties and the possibilities for fraud are huge. In one year, between 1997 and 1998, the US was able to double its estimate of its own carbon-fixing capacity merely by deciding to claim that wood products harvested from public lands and landfilled wood were part of its national carbon “sink” –even though it admitted that net sequestration rates in its ageing forests were slowing.

This is only the beginning. In order to be able to claim credibly that a tree plantation “equalled” or “compensated for” a certain quantity of CO₂ emitted, carbon-plantation proponents would have to factor in a figure representing the degree to which their plantations destroyed existing carbon reservoirs, thus adding CO₂ to the air. According to satellite-image analysis, in the 1980s, 75 per cent of new tree plantations in Southern countries in the tropics were established in places where, ten years earlier, natural forests had stood. The result was an estimated additional release of 725 million tonnes

of carbon dioxide to the atmosphere. Replacing grasslands with plantations –another common practice– can be equally counterproductive. Recent studies show that the Andean Paramos ecosystem, for example, is more efficient than tree plantations in absorbing CO₂.

Moreover, any communities displaced from carbon plantations or forests protected under carbon schemes would have to have their activities monitored closely for (say) a century, no matter where they had migrated to, to determine precisely to what extent they were encroaching on forests or grasslands elsewhere, and thus releasing the carbon stored in those ecosystems to the atmosphere.

Advocates would also have to quantify, with a high degree of certainty and over long periods of time, the degree to which carbon-“offset” plantations:

- * Resulted in a net increase in emissions due to releases from local soils cleared of understorey, under a number of possible climatic scenarios
- * Affected the carbon-storage capacity of soils downstream through erosion or other mechanisms
- * Suffered loss of trees from insect infestation, disease, or accident
- * Made uncontrollable fires more likely, as has happened in Iberia and Indonesia
- * Caused forests to be cleared elsewhere to make up for lost food or other crops.
- * Displaced timber operations to other locations
- * Brought about other social changes affecting net carbon sequestration, such as loss of sustainable local agricultural knowledge or rising consumerism
- * Drew funding away from other forms of carbon storage or sequestration, whose effectiveness would also need to be quantified for long periods under different scenarios
- * Slowed the development of technologies or networks of political resistance which could prevent the mining of remaining oil or coal
- * Undermined existing technologies or social networks which prevent climatically-destabilizing forms of industrial land clearance
- * Stimulated profiteers to degrade forests outside project boundaries in order to attract their own money for carbon projects
- * Caused local people to abandon already-instituted good forest conservation practices
- * Drove out of business other forestry operations not subsidised by carbon-“offset” money; or, alternatively, pushed up wood prices, increasing pressures for logging outside project boundaries
- * Affected the nature of the market for forest products and the market for land, both of which have an impact on net carbon emissions

In general, the relative carbon-fixing ability of any plantation –and thus whether it is helping relieve global warming or making it worse– would have to be determined by comparing the results with a “business as usual” scenario. After all, there is no point in establishing a plantation that would result in more carbon dioxide being released than would be emitted without the plantation. But who decides what “business as usual” is? Who can be trusted to decide “what would happen without the plantation”? An urban intellectual with no knowledge of rural economy or methods of land stewardship may well assume that without a plantation project ignorant local rustics would necessarily scorch the land into oblivion. A careless forester may imagine that “what would happen without the plantation” can be read off by extrapolating from physical and biological data collected in the past on site –forgetting that such predictions must inescapably also involve interpreting and predicting how human societies will behave and respond to knowledge of such data. A World Bank official will not want to compare the plantation with carbon-storage or sequestration options which involve broader political changes that make space for local forest conservation initiatives, such as reducing foreign demand for certain forestry products or fighting corporate or state repression. This is not even to begin to consider the huge incentives to out-and-out dishonesty in estimating “baseline” emissions on the part of those who stand to benefit from carbon-“offset” forestry.

Institutions whose future depends on certifying carbon-“offset” plantations acknowledge few of these difficulties. When they do, they tend to claim that they can be “fixed” through the sorts of statistical manipulation or clever design and management that they are used to providing, neglecting to note that these efforts merely amplify the underlying problems. Some carbon consultants, for instance,

claim that if growing one tonne of wood and preventing it from decay or combustion for a century in order to maximize its climate-stabilizing effects is too “iffy” a proposition, the same result can be achieved by growing, say, 10 or more tonnes of wood and protecting it from rot or fire for a more realistic 10 years. Unmentioned in such neat paper exercises are such facts as that growing 10 tonnes of wood instead of one is likely to require 10 times the amount of land, multiplying any damage to local livelihoods and the potential for social strife and counterproductive knock-on effects. Other consultants assert that the instability of any single plantation can be “insured against” by investing in a portfolio of other dubious projects –whose effects, taken together, are even less foreseeable and even more likely to be counterproductive.

In sum, the idea that a specified fragment of wooded land can “offset” a specified amount of industrial carbon-dioxide emissions depends on false assumptions about calculability. Large-scale “offset” plantations, instead of mitigating global warming, could even make it worse. In delaying the transition to a more equitable distribution of emissions and more sensible energy regimes, such plantations could result in an increased amount of avoidable carbon emissions both from industry and from the land. Forestry, therefore, should not be integrated into climate negotiations. Policymakers must separate the issue of emissions reduction from that of carbon-sink protection measures.

Who benefits?

Whatever the social inequities and irrationalities of carbon-“offset” plantations, the incentives to back them remain powerful among many elite groups:

* **CORPORATE NETWORKS** whose structures of knowledge, behaviour and investment are tied to mining and consuming remaining fossil fuel deposits were reluctant to allow US delegates to the climate negotiations to commit themselves even to tiny reductions in CO₂ emissions. Some companies aggressively promoting increased fossil fuel use in the South, such as Exxon, hypocritically told Northern negotiators not to agree to limit carbon emissions unless the South did too. When pressure for at least some symbolic (if insignificant) cuts became irresistible at the negotiations which led to the 1997 Kyoto Protocol, these corporations instructed US and other rich-country delegates to secure a quid pro quo that would allow trading in carbon “offsets”, including carbon credits from tree plantations, as a way of meeting reduction targets. This, they reasoned, would at least delay or avoid changes in established ways of doing business. Such corporate networks are also on the move outside the climate negotiations themselves. In January 1999, for instance, the Japan Federation of Economic Organizations proposed to Chinese President Jiang Zemin that a group of Japanese companies carry out a plantation programme in China as a way of securing larger quotas for emitting carbon dioxide under the Kyoto Protocol. In Britain, meanwhile, the Confederation of British Industry tried in 1999 to launch a carbon-trading system in order to stall or reduce the government’s planned energy tax.

* **UTILITIES** see carbon “offset” forestry as a cheap way of persuading state regulators or consumers that they are taking action over emissions. The Electricity Generating Board of the Netherlands has been involved both in a “carbon-sequestering” Malaysian timber plantation operation in Sabah and a pine and eucalyptus carbon plantation in the Ecuadorian Andes. Tokyo Electric Power is planting trees in New South Wales, Detroit Edison in Central America, and SaskPower of Canada and Pacific Power of Australia in their own countries.

* **ENERGY FIRMS** and others are also getting into the act. Carbon-emitting US companies have signed a US\$20 million deal with Costa Rica to pay farmers to plant trees and maintain them for 15-20 years. Amerada Gas is to earn a “Climate Care” label from the Oxford-based Carbon Storage Trust as part of a deal under which trees are planted in western Uganda. Suncor Energy (an oil-mining, refining and marketing firm based in Calgary, Canada) plans to join Southern Pacific Petroleum and Central Pacific Minerals in projects to plant more than 180,000 native trees in central Queensland to “offset” carbon dioxide emissions from future oil shale development.

* **CAR COMPANIES** hope to gain a green image by planting trees. In Britain, all customers buying Mazda’s new Demio model get an added bonus: the company plants five trees to “compensate” for their car’s first year of carbon dioxide emissions. Well-off consumers are thus being committed to collaboration not only in oil and metal mining and refining as well as heavy carbon dioxide production, but also to using plantation land which they may never see. Avis Europe, too, plans to plant one tree for every car in its rental fleet. Meanwhile, the Federation Internationale de l’Automobile has arranged for 30,000 trees to be planted in Chiapas, Mexico, on lands inhabited by highland Mayan Tojolobal and lowland Mayan Tzeltal communities, to “offset” the 5,500 tonnes of carbon emitted annually by Formula One car racing, at a bargain price of US\$61,000 a year.

* **TRADING FIRMS, BROKERS, AND INVESTMENT BANKS** expect to collect commissions for brokering carbon deals as carbon stock markets and futures exchanges take shape in Chicago, London and Sydney. Organizations such as the International Carbon Sequestration Federation and American Forests are already helping market carbon credits. **BANKS** such as Union Bank of Switzerland meanwhile look forward to lending money for new carbon plantations.

* **INDUSTRY-FRIENDLY THINK TANKS** such as the World Resources Institute often find sequestration and storage programmes in line with their general ideology and benefit from helping to plan and justify them.

* **MULTILATERAL AGENCIES** plan to feast on carbon trades, exploiting the political infrastructure they already have in place for transferring wealth from South to North. The World Bank, for example, hopes to benefit both from supporting wasteful new fossil fuel developments in the South and from “cleaning up” afterwards through plantation projects. The Bank is also using funding from utility companies and Nordic governments to develop a Prototype Carbon Fund whose purpose is to facilitate “global markets for greenhouse gas investments” and which features a portfolio of projects in the South. A Bank-supported Clean Development Mechanism (CDM), meanwhile, is being designed to subsidize trade in the resulting “carbon credits” by providing a carbon bank or carbon stock exchange. The United Nations Conference on Trade and Development is contributing tax monies to help set up an International Emissions Trading Association, a group of about 60 TNCs and environmental organizations which will help figure out how to “get the market moving”.

* All these trends have opened up opportunities to build up institutions, salaried positions and prestige for an increasing number of professionals who are willing to research, certify, and administer carbon-“offset” plantations –and who accordingly have a growing stake in “believing” in their efficacy. **CONSULTANCIES** such as SGS Forestry, Margules Poyry and Econergy International Corporation can gain lucrative contracts to monitor and justify carbon forestry projects. Carbon credits certified by SGS are already being offered on the Chicago Board of Trade. Some consultants even shuttle between serving United Nations organizations, lobbying the Conference of the Parties (COP) to the Framework Convention on Climate Change, and their own profit-making carbon-“offset” ventures. Mark Trexler, for example –whose pioneering firm Trexler & Associates stands to make fortunes from brokering carbon deals– was present at COP’s fourth meeting in Buenos Aires in November 1998, and is also a review editor of one chapter in the Intergovernmental Panel on Climate Change’s draft Special Report on Land Use, Land Use Change, and Forestry. The report, perhaps unsurprisingly, looks set to give a “scientific” stamp of approval to the idea that carbon accounting between tree plantations and industrial emissions is possible.

* Many **PROFESSIONAL FORESTERS** see a carbon-offset plantation boom as a way of making their marginalised and politically weak profession important and well-endowed. Many foresters also sincerely hope that extra money for carbon-offset forestry, whatever the problems with the concept, would translate into better programmes to preserve native forests and benefit “excluded groups” and local livelihoods. In this they are influenced by certain neoclassical **ECONOMISTS** who claim that the only alternative to converting native forests to agriculture which is likely to “pay” in strict market terms is treating them as carbon “offsets”. **GENETIC ENGINEERING RESEARCHERS** also expect to find an outlet for their labours in the growing carbon plantation market. (Ironically, while the paper industry is looking forward to genetically-engineered plantation trees low in lignin –a structural element in trees which cannot be used in the manufacture of high-quality paper– the incipient carbon industry is looking forward to genetically-engineered trees with extra lignin to foster long survival.) **ACADEMICS** from institutions like the University of Edinburgh and the University of Florida are meanwhile joining in carbon-certification and monitoring activities.

* **NORTHERN GOVERNMENT OFFICIALS** in many countries have followed along enthusiastically. The Australian government, for example, hopes that creating trial markets in emissions permits and carbon credits will spur economic growth. An agriculture minister in New South Wales has exulted over a “dynamic new industry” which would create jobs out of a million hectares of new plantations, some of them paid for with money from Japanese utilities. The Canadian International Development Agency has agreed to forgive about US\$680,000 of Honduras’ \$11 million debt with Canada if Honduras will establish an office under the Kyoto Protocol to promote tree plantations and monitor forest conservation. In return, Canada gets credit for “cutting” emissions of carbon dioxide and other greenhouse gases without having to change its industrial practices at all.

* Many **SOUTHERN GOVERNMENTS** are unlikely to be in a position to resist the carbon-plantation wave. Costa Rica is perhaps most openly inviting carbon forestry deals, having already established a National Carbon Fund from which investors can buy Certified Tradable Offsets created through the channelling of Northern capital to forestry project developers. Even Argentina has reportedly toyed with the idea that it could earn US\$700 million a year for “maintaining carbon dioxide-absorbing forests” established, with the help of \$4 billion in foreign investment, on 10 million

hectares of what is now mainly grassland. Some 26 African ministers have made a special appeal for CDM funds, asking for a “seed fund” to help them prepare the necessary administration.

* Some **PLANTATION OWNERS** and their state backers hope to gain either more investment or a greener image from carbon deals. A commercial grower of coniferous trees in Ireland, for instance, recently cited research showing Norway spruce stores more carbon than mixed deciduous forests. Malaysia’s Primary Industries Minister soon chimed in with the claim that his country’s oil palm plantations were in fact “better than the developed nations’ pine trees in terms of absorbing carbon gases”.

* Other **FORESTRY COMPANIES** are also ready to cash in. No sooner had global warming become a hot political topic, for example, than an American Forest Association official proposed planting 100 million trees to help ameliorate global warming. In Norway, the forestry company Treefarms has announced a project to plant fast-growing pine and eucalyptus trees on 150 square kilometres of grassy plain in southwest Tanzania. The company claims that by 2010 the project will store more than a million tonnes of carbon.

* Certain **NON-GOVERNMENTAL ORGANIZATIONS**, by carving out a position for themselves as carbon brokers and “offset” specialists, hope to gain a reputation with patrons or peers in government and business as advocates of the fashionable “free market” approach to environmental issues. The Environmental Defense Fund and the Rainforest Alliance, for example, have joined the Forestry Research Institute in helping to audit Suncor Corporation’s carbon forestry projects in Central America and elsewhere.

Whose atmosphere is it, anyway?

With all these interest groups behind them, it is not surprising how widespread the idea of carbon-“offset” plantations has become. According to **Business Week**, four million hectares of such plantations already exist worldwide. Mark Trexler reckons that carbon trading –including, but not limited to, schemes involving forestry– could amount to US\$ 40-100 billion a year by 2020, while the World Bank projects a figure of \$150 billion. The Electric Power Research Institute foresees the value of carbon-dioxide emissions permits reaching \$13 trillion by 2050.

Scary as such figures may be, they are based so far only on dreams, not on reality. They presuppose that the struggle to create a market in carbon “offsets” –a universal Carbon Shop– has already largely been won. This is far from being the case. One cannot, simply by waving a magic wand, turn the atmosphere –or the right to use it as a dump for carbon dioxide– into private property. One cannot, simply by waving a magic wand, award the lion’s share of that property to the rich. One cannot, simply by a further wave of the wand, empower the rich to buy up rights to pollute still more of the atmosphere on condition that they seize and degrade vast tracts of land with tree plantations.

Standing in the way are many obstacles. Among these are common sense, science, and –by far the most important of all– the inevitable opposition of many who live or depend on that land, or who would otherwise lose out as a result of the redistribution of atmospheric rights from poor to rich. These include, among others, many whose land is in danger of being drowned by the rising sea levels of Greenhouse Earth.

Like the enclosure movement of early modern Europe, through which common lands were taken away from the rural poor and broken up, privatized and traded into the hands of the better-off, the movement for carbon-“offset” plantations is in essence a movement to extend and normalize inequality. For the present, its beneficiaries may be able to conceal this fact through diplomatic or fake-scientific talk about “efficiency”, “flexible mechanisms”, and “tonne-year carbon accounting”. Ultimately, however, the political, social and ecological thrust of large-scale carbon-“offset” plantations will become impossible to hide from those most affected. People whose lives and livelihoods are threatened by such plantations will almost certainly find themselves in the end joining hands with movements against other large-scale tree plantations such as pulpwood and oil palm.

Any movement critical of the unrestricted growth of a global Carbon Shop has the good fortune of having available to it at least one already-formulated positive agenda –a rallying point which is both scientifically sound and based on the principle that everyone should have equal rights to use of the atmosphere. This is the principle of “contraction and convergence”. According to this principle, countries would negotiate (and, if necessary, constantly renegotiate) a ceiling on carbon-dioxide concentrations in the atmosphere in line with changing scientific estimates of the danger level. They would then agree to progressive cuts in emissions which would allow that goal to be reached at the same time that emissions levels among rich and poor were gradually equalized.

To take a hypothetical example, suppose all countries agreed that 450 parts per million by volume were the maximum upper limit for CO₂ in the atmosphere that could be allowed before the year 2100. Suppose they also decided that by the year 2030 per capita emissions throughout the world should be equal. To reach that figure, Britain would need to reduce its current emissions by about half and the US by more than three-quarters, while China would be permitted to increase its emissions by no more than 41 per cent and Bangladesh by no more than 2354 per cent. After 2030, all would progressively reduce their emissions pro rata to a final per capita entitlement of 0.2 tonne of carbon per year by the year 2100.

Instead of enshrining and expanding inequalities in resource use while concealing the pathologies of the current pattern of fossil-fuel exploitation –as the appeal to grand-scale carbon-“offset” plantations does– such an approach would go straight to the root of the climate crisis. Realistically, a livable climate can be promoted not through more monoculture plantations, more logging, more fossil-fuel plants and more automobiles, but only through a commitment to equality.

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About WRM

The World Rainforest Movement is an international network of citizens' groups of North and South involved in efforts to defend the world's rainforests. It works to secure the lands and livelihoods of forest peoples and supports their efforts to defend the forests from commercial logging, dams, mining, oil exploitation, plantations, shrimp farms, colonization and settlement and other projects that threaten them.

The World Rainforest Movement was established in 1986 and initially focused its activities on the flaws in the FAO and World Bank's "Tropical Forestry Action Plan" and countering the excesses of the tropical timber trade and the problems of the International Tropical Timber Organisation. In 1989, the WRM published the "Penang Declaration" which sets out the shared vision of the WRM's members. As well as identifying the main causes of tropical deforestation and singling out the deficiencies of the main official responses to the deforestation crisis, the Declaration highlights an alternative model of development in the rainforests, based on securing the lands and livelihoods of forest peoples.

In 1998, the WRM published the "Montevideo Declaration" and launched its campaign against monoculture tree plantations that are increasingly being promoted particularly in the South. These plantations, promoted as "planted forests", are resulting in a number of negative social and environmental impacts on local communities. This campaign aims at generating conscience on and organizing opposition to this type of forestry development.

The WRM is part of the Global Secretariat of the Joint Initiative to Address the Underlying Causes of Deforestation and Forest Degradation, a process linked to the work of the Intergovernmental Forum on Forests.

The WRM distributes a monthly electronic bulletin, in English and in Spanish, to serve as an information dissemination tool of local struggles and on global processes which may affect local forests and people. It also disseminates relevant information and documentation through its web site.

The WRM International Secretariat is headquartered in Montevideo, Uruguay, while its European Office is based in Moreton-in-Marsh, United Kingdom.

