Chapter 4
Offsets – The fossil economy's new arena of conflict

In which it is shown how projects designed to 'compensate' for continued fossil fuel use are helping to dispossess ordinary people of their land, water, air – and futures.

Introduction

Again and again, this special report has returned to the difficult truth that there is only one way of addressing the climate crisis: to keep most remaining coal, oil and gas in the ground.

To find a democratic way of doing so quickly seems a tall order in a world whose industrial societies are ever more dependent on fossil energy. As has been detailed in previous chapters, political and business leaders, experts and even many NGOs, while increasingly alarmed, even despairing, about climate change, have so far shown few signs of facing up to the end of the fossil era.

But, as this report has also stressed, there is at least one group – and a very large one – for whom the idea of leaving coal, oil and gas in the ground is not necessarily a revolutionary concept. These are people whose lives, livelihoods and land have already been damaged or devastated by fossil fuel exploration, extraction, refining, transport, use and all the institutions that surround them.

For this group, the struggle to stabilise climate – to stop the world's above-ground carbon dump from overflowing – is likely to look like only one chapter in a much longer and broader history. When indigenous peoples who have lost their lands through oil drilling meet others whose Arctic hunting grounds are falling victim to climate change, when communities battling the construction of gas pipelines that would pass over their common lands encounter fenceline communities whose children's health is ruined by air pollution from refineries or power plants, when opponents of airport expansion meet impoverished city dwellers who have lost their neighbourhoods to a hurricane strengthened by warming subtropical waters, awareness cannot but grow that, despite their differences, all such communities are facing a common struggle.

And now a new group is on stage: communities facing the new 'carbon-saving' projects that generate the credits bought and sold in the carbon market. Such projects – tree plantations, industrial gas destruction projects, and many others – not only help perpetuate the old problems of coal, oil and gas; they often bring new problems as well.

In order to generate carbon credits from trees or energy crops, plantation companies have to maintain their hold on land that ordinary people may need for other purposes. In order to generate carbon credits from burning the methane bubbling out of landfill sites, authorities have to fight to keep them open. In order to keep track of the carbon their agroforestry schemes generate, rural development organisations have to divert resources from their traditional work. In order to get carbon credits for halting flaring, oil companies have to go on drilling and polluting.

And all the while, new strip mines continue to be opened, oil continues to be spilled, and chemical pollutants continue to waft over power-generating plants. Every Clean Development Mechanism or Joint Implementation project set up under the Kyoto Protocol, or 'carbon offset' scheme launched by a private firm, helps perpetuate the fatal flow of fossil carbon out of the ground and into the air just as surely as any drill bit or transcontinental pipeline.

The fossil fuel economy's new frontier, in short, has become a new battlefield. Added to classic local conflicts over extraction, pollution,

'Middle East nations call oil the "blood of the earth". No resource is more critical to [US] industry, security, and freedom… Let's open up the Arctic National Wildlife Refuge to drilling…pump out of the Strategic Petroleum Reserve… clear the way for exploration on the Outer Continental Shelf… Tell Saudi Arabia, Kuwait, and the sheikdoms of the Gulf that if they do not begin to pump enough oil to cut the price to USD 20 a barrel by fall, they can look elsewhere the next time war clouds descend over the Gulf.'

Patrick Buchanan, US presidential candidate, 2000

and labour abuse are now, increasingly, local conflicts over 'carbon offsets' – the projects that license and excuse the extraction, the pollution and the abuse.

'Oil, the blood of the earth, has become, in time of war, the blood of victory.'

Henry Berenger, adviser to French Prime Minister Clemenceau, 1918

At first glance, these new conflicts may seem to be only indirectly connected to fossil fuels. People fighting industrial tree plantations in Brazil, for example, may never catch a whiff of the hydrocarbons whose release in Scotland the plantations are supposed to justify and excuse. But the struggle of the exploited community in Brazil and the polluted community in Scotland are, in a sense, one. In discovering the other's struggle, each, in a sense, rediscovers its own. The Kyoto Protocol and other carbon market schemes springing up around the world, in globalising the defence of fossil fuels in a new way, are also globalising conflicts and movements over fossil fuels in a new way.

Oil is the blood of the earth, and should not be taken away. We cannot do that.'

Berito Kubaruwa, U'wa, Colombian Amazon, 1998

In the past, the deeper meanings of dependence on fossil fuel could be understood by coming to grips with the experience of oil wars, polluted farmland, lung disease, militarisation, strip mines, disappearing forests and degraded ice caps. But this is no longer enough. Today, anyone who wants to understand what fossil fuel dependence means also has to look closely at the 'carbon offset' and 'carbon saving' projects now being set up around the globe, under the auspices of the Kyoto Protocol's 'flexible mechanisms', the World Bank and innumerable consultancies and other private firms; to ask questions about them; and to listen to the voices of those who are affected.

'No blood for oil.'

Antiwar slogan, 1990, 2002

Looking at tensions and conflicts in Guatemala, Ecuador, Uganda, Costa Rica, India, Sri Lanka, Thailand, South Africa and Brazil, this chapter brings together a few of these questions and voices. It attempts to introduce these struggles in the only way they can be introduced: through studying what actually happens on the ground.

The topic is difficult. As the last chapter has tried to indicate, the market in credits generated by 'carbon-saving' involves some of the most arcane and convoluted technical, legal and intellectual exercises ever devised in the service of perpetuating inequality and environmental folly.

But as elsewhere in this special report, a question-and-answer format may help bring the issues surrounding the new carbon market closer to open public debate. And as with previous chapters, it's hoped that questions will continue to be raised even after the last page is turned.

The beginnings – A story from Guatemala

The beginnings of the 'carbon offset' idea can be traced back at least as far as 1977, when the physicist Freeman Dyson speculated that large-scale planting of trees or swamp plants could be a cheap means of soaking up excess carbon dioxide in the atmosphere.[1]

But it wasn't until 1989 that the first forestry project funded explicitly to offset greenhouse gas emissions was set up.[2]

Applied Energy Service, Inc. (AES), a United States-based independent power producer, had been looking for a cost-effective technique for reducing carbon dioxide emissions at a new 183-megawatt coal-fired power plant in Connecticut in order to make the plant more acceptable to state regulators. On the recommendation of the Washington-based World Resources Institute (WRI), AES decided to try to 'mitigate' the plant's carbon emissions by offering USD 2 million to finance 10 years' worth of 'land-use activities and multiple-use forestry projects' in Guatemala.

The activities would be undertaken by the organisation CARE with the help of USAID and the Guatemalan Directorate General of Forests.[3] CARE had been working in agroforestry since 1974 in the Western Highlands – one of the country's few remaining highland areas with existing forest and the potential to offset significant quantities of carbon – and it was hoped that the AES money could leverage additional funds from other sources (debt-for-nature swaps) as well as volunteer services from groups such as the US Peace Corps.

Some 40,000 smallholder farmers would plant 50 million pine and eucalyptus trees in the course of establishing 12,000 hectares of community woodlots, 60,000 hectares of agroforestry and 2,880 kilometres of live fences. Some 2,000 hectares of vulnerable slopes in local watersheds would be protected and training provided for forest fire brigades to reduce the threat of fire and potential CO_2 release. During its first 10 years, the project would also train local communities so that its activities would become self-sustaining. In all, AES finance would make possible the sequestration of 15.5 to 16.3 million tonnes of carbon in Guatemala

– more than enough, it was claimed, to cover the 14.1 million tonnes the Connecticut plant would emit over its 40-year lifetime.[4]

Did it work?

No. In 1999, an external evaluation of the AES-CARE project showed that, even by its own carbon-accounting standards, it was falling far short of the 1 million tonnes of carbon it was supposed to have 'offset' to date.[5]

What happened?

Three scenes from the Western Highlands.

The project was built around the assumption that using the area for carbon production would be compatible with improving local quality of life through increasing agricultural productivity, watershed protection, and improved fuelwood access. But the designers didn't sufficiently grasp what the project would mean for farmers in their local political context.

First, many of the mainly indigenous subsistence farmers in the project area in the Western Highlands had been pushed to the edge of the agricultural frontier as land in the fertile lowlands became concentrated in the agribusiness sector. The Western Highlands encompass the country's poorest communities and most environmentally degraded areas. More than 90 per cent of rural households live in absolute poverty,[6] and with population densities exceeding 100 people per square kilometre and a deforestation rate of 90,000 hectares per year, erosion and land degradation have led to an intensification of rural land use even as poverty rates increase. The average family in the Western Highlands has access to less than one hectare of land for farming.

Yet at the same time, land with official forest status was often declared off-limits to continued agricultural use under Guatemala's 1996 forest law. The government was trying to re-locate control over communal forests into the hands of municipal authorities, and the law criminalised subsistence activities such as fuelwood gathering.

Well, wasn't that a good thing? It helped protect the carbon stored in the trees.

What it did first and foremost was to take access to the trees out of the hands of ordinary people. One result was that conflict grew between municipal and village authorities and individual landowners. Another was that reforestation looked less attractive. Who wants to plant trees if by doing so you deprive yourself of daily necessities? A third result was increasing distrust of government forest offices, some of which were partly funded by the CARE/AES Agroforestry Project. Not a

good outcome, whether your objective was people's welfare or long-term carbon savings.

Then, too, in the early years of the project, the tree species promoted were often inappropriate for the climate and for degraded land areas. Damage by animals and sabotage of replanted areas also limited the expansion of reforested areas.

But what about agroforestry systems, which allow farmers to make use of the carbon-sequestering areas?

Agroforestry systems are indeed more attractive to local farmers, as they serve multiple purposes (grazing, fodder and fuelwood provision, and subsistence or cash-crop components). But they typically take three to five years to become productive. That also makes them a difficult option for families with limited land.

So it was hard to reconcile local people's needs with the goal of carbon production.

In more ways than one. Another problem was CARE's need to channel more and more of its limited personnel and finance into monitoring and measuring carbon instead of trying to improve people's lives.

In the past, CARE had had a respectable record of promoting sustainable agriculture and agroforestry, and even some success in protecting water sources through reforestation, although less so in the Western Highlands. The organisation had a great deal of experience in training local community extension agents, providing seeds and tree nursery supplies, and training local people in soil conservation, fodder production and watershed management. CARE extension agents also provided advice and materials for improving grazing areas and soil recuperation, services that local project participants continue to evaluate positively.

The new carbon focus for its work, however, meant that finance and staff time began gravitating away from agroforestry towards reforestation, and away from farm extension work towards unfamiliar work in modelling and monitoring carbon emissions benefits.

Couldn't the staff do both things at once?

It's not so easy. Carbon accounting is specialised, complicated work. The market needs hard carbon numbers. You can't just look at a couple of trees and say that they will have soaked up the carbon equivalent of one 1000-kilometre airline flight by 2020. You have to look at growth rates, soil changes, interaction with local communities, how

Villagers in CARE's target area.

The research on Guatemala on which this section draws was carried out by Dr Hannah K. Wittman of Simon Fraser University. It was conducted in the context of a participatory evaluation (that included community mapping and a household-level questionnaire) of CARE's agroforestry extension programme, operating in two villages in the municipalities of San José Ojetenam and Ixchiguán in the state of San Marcos in the Guatemalan Highlands.

much greenhouse gas the landscape would have released compared to what would have happened without the project. In fact, if you look carefully enough, as Chapter 3 has argued, you find you can't do the calculations at all.[7]

The complexity (or impossibility) of this new job played real havoc with CARE's original mission. CARE was used to training and agricultural extension, not carbon monitoring. In 1999, the organisation still didn't have a methodology in place for measuring and monitoring carbon in agroforestry plots and forests.

An external evaluation conducted in 1999 by Winrock International laid down the law: the project's certified carbon production had to be improved to make it 'more acceptable as a CDM-type of project'.[8] A land-use mapping system using a Geographic Information System had to be developed together with remote sensing technologies that could track project changes. 'Proxy areas' had to be identified to serve as a 'without-project' baseline, and a carbon-monitoring programme for all project activities for which carbon credits would be claimed had to be set up.

In short, the Winrock evaluators, mindful of the requirements of the carbon market, reversed CARE's own emphasis on livelihood over carbon sequestration. By 2000, CARE officials were openly discussing the possible need to redirect resources formerly channelled to extension activities to pay outside consultants to develop carbon accounting methodologies.

But surely most of CARE's agricultural extension work went on as before?

Not necessarily. The new carbon rules were an incentive to CARE to shift its reforestation focus to larger farmers, who had more resources available to undertake reforestation projects and were thus better equipped to help CARE comply with its carbon sequestration commitments.

The new carbon focus of CARE's work also made its objectives and premises harder to share with farmers. Even as of 2000-01, farmers were not being told what the project was about, nor how their reforestation and fire brigade efforts contributed to carbon mitigation, nor what the impacts on them of a changing climate might be. Nor were they even directly paid for their reforestation activities. That, of course, made it impossible to discuss with them their role in, or rewards for, offsetting Northern carbon emissions, or to ask them how their own knowledge might improve carbon sequestration design or dissemination. 'Participatory' carbon sequestration it was not.

From the Netherlands to the Andes – A tale from Ecuador

The Dutch FACE Foundation, or 'Forest Absorbing Carbon Dioxide Emissions', was established in 1990 by the Board of Management of the Dutch Electricity Generating Companies. The original idea was to establish 150,000 hectares of tree plantations to compensate for the emissions from a new 600-megawatt coal-fired electricity generation plant to be built in The Netherlands. 'For reasons of land availability and cost-effectiveness', FACE explained, 'greater emphasis has been placed on collaboration with developing countries and countries in transition'.[9]

Since 2000, the FACE Foundation has been producing and selling carbon credits from tree plantations as an independent, non-profit organisation. It trades the credits through two Dutch companies: Business for Climate (set up by FACE in 2002 jointly with Triodos Bank and Kegado BV) and Triodos Climate Clearing House.

The FACE Foundation has five projects worldwide: in Malaysia, the Netherlands, the Czech Republic, Ecuador and Uganda. The FACE Programme for Forestation in Ecuador S.A., or PROFAFOR, currently the largest, was set up in 1993. PROFAFOR has not been approved as a UN Clean Development Mechanism (CDM) project. But it does see itself as 'potentially CDM-compliant' – as sequestering carbon over and above what would have been the case otherwise, as providing social, economic and environmental benefits, and so on.

PROFAFOR originally thought to plant 75,000 hectares of trees, but later revised this goal downward to 25,000 ha. So far contracts have been signed for the plantation of 24,000 ha, and 22,000 ha have actually been planted. Initially, PROFAFOR activities were focused on the Andean region, or Sierra, and 8,000 ha have been planted under contract with 39 indigenous mountain communities. However, since 2000, contracts have also been signed in Ecuador's coastal region.[10]

Well, planting trees is bound to be a good thing for everybody involved, isn't it?

It's not so simple. The Sierra sites used by PROFAFOR are located in a biome known by the colonial Spanish term *paramo* – which denotes high altitude plains or barren plateaus without woodlands. This zone was never forested, although it does support some trees. The dominant vegetation is Andean grasses from the genuses *Festuca, Stipa, Calamagrostis* and *Deyeuxia*.

Paramo soils.

The dark, volcanic *paramo* soils have a complex particulate structure that, in the cold, moist climate of the Sierra, enables them to retain a great deal of water and organic matter. The soils have a far greater capacity to hold water than the vegetation covering them, although a layer of plants is important to keep moisture in the soils during dry seasons. In the humid but not high-rainfall Sierra environment, *paramo* soils are believed to be the main water reservoirs for the local inhabitants.

Although indigenous agriculture has been practised for hundreds of years up to 3,500 metres (the Sacred Valley of Cuzco, a centre of indigenous agriculture, lies at around 3,000 metres), the ecological balance of the *paramo* above 3,200 metres is very fragile. If the plant cover is removed even temporarily, evaporation from the surface increases and organic matter in the soil begins to decompose, resulting in reduced capacity to hold water. Once dry, the soils cannot recover their original structure and organic content, even when they get wet again.

The monoculture tree plantations PROFAFOR sets up to fix carbon are a bizarre and damaging innovation in this environment. The species used are exotics commonly used in industrial plantations elsewhere. Some 90 per cent are pine, either *Pinus radiata* (particularly in the provinces of Carchi and Chimborazo) or, to a lesser extent, *Pinus patula* (mainly planted in Cañar and Loja). Eucalyptus and cypress species make up another 4 per cent.

But what's wrong with pine trees? PROFAFOR says that experiments with pine in different places get different results and that 'it cannot be categorically stated that pine is noxious for paramo soils.'

PROFAFOR's non-indigenous pines dry out and crack the soils, not only because they disturb the existing vegetative cover, but also because they use a great deal of water. Organic matter and biological activity decline, uncompensated for by the fall of pine needles. Soils tend to be transformed from water retainers to water repellents, and surrounding flora and fauna are deprived of food and habitat.[11]

The threat is not only to local hydrology, but also, ironically, to local carbon storage capacity. Subject to less extreme variations in temperature and humidity than the drier Southern Andean zone known by the indigenous term *puna*, the *paramo* stores in its thick layers of soil vast amounts of carbon – perhaps 1,700 tonnes per hectare in the case of Carchi province, more than a tropical forest – but only as long as the soils are not exposed to the air and to increased erosion through planting operations and firebreaks.

Under the PROFAFOR project, villagers are obliged to construct firebreaks in which the *pajonal* grasses protecting the soil of the *paramo* are uprooted in a strip bordering the plantation, leaving the soil exposed.

In addition, the carbon in the trees is at risk from fire. In the community of SigSig in Azuay province, fires have already killed or stunted the growth of many pines. And fires are likely to recur continuously, given a fire-prone natural flora, traditional burning practices used to encourage fodder regrowth, strong winds, firebreaks that are too few and too narrow, and the lack of permanent wardens or fire-fighting equipment. The yellowish needles appearing on numerous local stands of *Pinus patula* signal the species' poor adaptation to the Andean environment, possibly indicating lack of a crucial micronutrient or of the mycorrhizal fungi that facilitate the tree's nutrient absorption in its native environment. Animals have meanwhile broken off many terminal shoots, giving rise to a bushy growth, which may prevent the trees from developing trunks suitable for the sawmill. Growth is slow.

Wait a minute. Are you telling me that a project which was designed to absorb carbon may actually be emitting it?

'At an assembly this engineer told us that thousands of dollars would enter the commune [for tree-planting]…that afterwards we were going to have sources of work till after the harvest, that we were going to collect who knows how much money. And the assembly signed…you know, sometimes we country people, we don't know, we fall for it naively.'

SigSig community member

Scholar Veronica Vidal found not only that the soils in PROFAFOR plantations are releasing more carbon than the firm takes account of, but also that the pine plantations are capable of absorbing less carbon than the firm claims. She concluded that the net carbon balance in PROFAFOR plantations may well be negative: 'We are facing a lose-lose situation, in which those who most lose are the future generations that will have to face the problems of climate change.'[12]

But according to PROFAFOR, local soils have been 'degraded by extensive use', and planting pine and eucalyptus in the paramo will restore them and prevent erosion.

Although some of the sites used by PROFAFOR, situated between roughly 3,200 and 4,800 metres, have been used for grazing, they have not usually been cultivated, due to their remoteness and the harsh climate. The idea that the soils on these sites, which still fulfil their original functions, are being degraded in any way that pine plantations could remedy is simply false. As for erosion, it is the pine plantations and their firebreaks themselves that are likely to create the greater problem.

Wait, I'm getting confused here. PROFAFOR says that this environment is in bad shape. Following the Spanish conquest, many indigenous peoples had to retreat to high altitudes because Hispanic and mestizo *communities were spreading out in the inter-Andean valleys and the Spaniards were taking over land for large estates or private ranches. The land reform laws of 1964 and 1973 helped intensify the exploitation of the* paramo *even further by transferring higher, less productive areas of* hacienda *lands to indigenous peoples. Today, agriculture is being practised up to 3,900 metres, and cattle-raising up to 4,500 metres.[13] On its plantation sites, PROFAFOR says, the land is so degraded that farming is just 'not profitable and the land is not suitable for subsistence activities'.[14] In this context, surely pine trees will be both an ecological and an economic improvement, no? And a way, as PROFAFOR puts it, of 'taking advantage of land that is not being used and that could generate income to the local economy'?*

Confusion is only to be expected in a situation like this, in which PROFAFOR is saying one thing (largely to an international audience) and local people are saying another thing (largely to themselves).

But it's useful to remember that there's a long global history to the kind of claim that PROFAFOR is making, that a certain set of common lands are 'waste', 'degraded' or 'unused', and are idly waiting to be brought into the commodity market before they can become 'productive'. It's a claim that was used in the Americas during the colonial era to seize indigenous peoples' cropland and hunting and gathering

grounds and transform them into the private property of Europeans. It has also been used in India, with more mixed success, since the colonial era, and in Africa as well. And it was used in Europe during the great eras of enclosure 200 and more years ago. In each of these cases the claim concealed and justified takeovers of land that was not only usable and ecologically rich, but used for all sorts of livelihood purposes. And the same is true of the *paramo*.

PROFAFOR's says that it would have liked to use native species but that 'the majority of native species have almost disappeared, and local knowledge of indigenous tree species has been lost with the trees."[15]

Although the *paramo* zone has never been thickly forested, people there retain a knowledge of native trees. In one PROFAFOR area, San Sebastián de SigSig in Azuay province, villagers are easily able to name and describe uses for a dozen native species.[16] Yet the only Andean tree species used by the PROFAFOR project, and on a very small percentage of its sites, is *Polylepis incana*. This is a sub-*paramo* species and it too is being planted in monoculture.

The English-language PROFAFOR brochure says that local people 'have a say in species selection and they prefer planting non-indigenous pine and eucalyptus species."[17] *And the Ecuadorean government sees PROFAFOR as contributing to its own plans for afforesting or reforesting 250,000 hectares in the Andean zone over 15 years.*

But what do local people themselves say about the pine plantations? Lets look at the history.

PROFAFOR said the communities would get both income and employment from the project. In addition to payments per planted hectare, they would get seedlings, technical assistance and training. They would have work for many years. They would have access to the plantations to collect mushrooms, resins, firewood and wood from thinning. And after 20-30 years they would be allowed to harvest the trees and sell the timber. All PROFAFOR asked in return was 100 per cent of the rights to the carbon fixed in the trees. It sounded terrific.

I have a feeling you're going to tell me that things didn't turn out as promised.

That's an understatement. Let's start by looking at what happened in three communities that signed contracts with the company between 1997 and 2000. Communities were offered payments of between USD 165 and USD 189 per hectare planted. But the cost of plants and technical assistance during the first three first years of plantation was then deducted, leaving the communities with about half of what they were initially offered (see Table 5).

Pine plantings in Ecuador.

Table 5. Offered and actual payments for plantations

Community	Area leased	Payment agreed per hectare (in USD)	Total amount offered (in USD)	Deductions for plants and technical assistance (in USD)	Amount disbursed to the community (in USD)	Percent deducted
San Sebastián de SigSig	400 ha	$189	$75,600	$36,800	$38,800	49%
Pisambilla	300 ha	$165	$49,500	$22,500	$27,000	46%
Mojandita Avelino Dávila	130 ha	$165	$21,450	$9,750	$11,700	46%

Source: PROFAFOR Forestation contracts

When SigSig community asked how much technicians were being paid for this technical assistance, they were told that PROFAFOR did not have the 'capacity to ask for these reports . . . it is an administrative matter'. Meanwhile, the price of the planting stock doubled or tripled. And in the end it was the commune, and not PROFAFOR, as specified in the contract, that had to transport the stock from the nursery.

Well, but little misunderstandings like this will crop up in every business transaction. You just have to get on with it. What does this have to do with the big picture of addressing climate change?

It doesn't end there. After having deducted the cost of the seedlings and technical assistance, PROFAFOR was obligated to pay 80 per cent of the remainder in three instalments during the first year after the contract was signed – as long as it wasn't necessary to replant more than 25 per cent of the seedlings. The remaining 20 per cent was then to be handed over to the community 'following complete fulfilment of the activities foreseen' by the company for the second and third year after the contract was signed.

There were several problems here that villagers weren't ready for. First, when trees die because they 'do not adapt', the community has to take on the cost of new seedlings for re-plantation. This happens quite frequently, because of the quality of the plants, the cold and windy conditions of the high-altitude plantation areas, or for other reasons. According to Mary Milne of the Centre for International Forestry Research, the re-plantation rate for PROFAFOR is 'between 15 and 30 per cent and costs range between USD 865 and USD 5,820, which have to be absorbed by the communities.'[18]

A bigger problem is that because of the necessity of guaranteeing a long lifetime for the carbon sequestered in PROFAFOR's trees, each community has to maintain the trees itself for 20–30 years before being allowed to harvest them and sell the timber. (More recent

PROFAFOR contracts demand even longer terms, of up to 99 years.) But the money runs out long before that. Nor are the communities given any information on where or how they might market the timber.

But it's not only a money matter. The PROFAFOR contract also ensures that the community turns over communal land and labour to the company for free.

How does that work?

Well, take land first. Under the contract, PROFAFOR gets – rent-free – large tracts of community land, which then cannot be turned to any other purpose than the production of carbon credits for the international market for 20 or 30 years.

This is not farmland. Cultivation goes on in other zones of communal property where the land has already been divided up among families. But PROFAFOR is wrong to say that the land is 'degraded', 'is not being used' or 'is not suitable for subsistence activities', and that it is idly waiting to be transformed into an asset by being 'incorporated into the national economy'.

In addition to having important hydrological functions, much of the land is used for grazing or could be rented out for that purpose. When the plantations are set up, families owning cattle may have to rent other lands for their animals, purchase fodder, or reduce their herds. This has an impact on family savings, not only because the monetary compensation villagers get from PROFAFOR is too small and must be used immediately for plantation expenses, but also because, by its nature, cash cannot play the role of the more stable, less liquid, traditional savings embodied in family cattle.[19]

Small wonder that local people feel that they have essentially transferred the land and its potential to generate savings for exclusive PROFAFOR use. As one said, 'We cannot touch or do anything on the area signed over.'

And does PROFAFOR really also appropriate communities' labour for free? PROFAFOR claims that it provides thousands of well-paid jobs to indigenous communities in Ecuador.

A lot of these jobs are, in fact, onerous and unremunerated tasks that the communities find themselves unwillingly taking on because of debt. In fact, PROFAFOR has not only failed to provide the jobs it has offered, but has also forced communities to hire people from outside to carry out PROFAFOR work. Local people, it turns out,

often do not possess the necessary technical skills PROFAFOR management plans require. PROFAFOR's training – workshops for two leaders from each community, held in hotels or other venues in nearby cities – is widely seen as insufficient and too theoretical. In addition, the plantations are often too remote or subject to too extreme climatic conditions for local people to work on themselves.

Where tasks remain incomplete, the community has to fall back on its own unpaid labour pool – a system called *minga* – to fulfil its contractual obligations. Essentially, villagers are forced to exploit their own system of free communal labour in order to escape debt (see box below).

Minga: *Organising Labour without a Market*

Minga is a communal pool of non-marketed labour typical of the indigenous communities of the Andes. Among the Quechuas, *minga* is directed at a specific collective material objective: planting and harvesting, or building or maintaining access routes, irrigation channels, schools or health centres. It is a complex mechanism for social interaction in which, generally for one day each week, both men and women, adults and children, are mobilised.

People working under *minga* receive no money. Rather, the system is one of reciprocity and mutual help. When *minga* is granted to achieve individual purposes, the *mingado*, or beneficiary, enters into an obligation to return *minga* to the *mingueros*, or workers, at some point in the future.

As one villager from Chuchuqui said: '… they paid for dibbling for pine only, not for eucalyptus. And they did not pay me, I worked under *minga*… Where we could not work, they hired people from Quito and Chimborazo and the community paid the workers.'

But surely the communities must have made some money out of the deal?

Well, it's instructive to try to do the maths. Look at what happened to SigSig. The community was to receive about USD 75,000 for 400 hectares of *Pinus patula* plantation to be sited on land a three- to four-hour walk from the settlement's centre, at approximately 3,700 metres. Plotting, dibbling, planting and construction of the firebreak were carried out between June 1998 and December 1999. But some of the seedlings didn't take, and the community had to hire outside labour to replant, using the funds supplied by PROFAFOR. The community built a house in the area of the plantation in mid-1999 and a guard was hired for the first two years.

In 2000 and again in 2004, fires swept through large parts of the plantation. The community had to take on most of the costs of replanting – including labour, transportation and food – with PROFAFOR

picking up only the costs of seedlings. The community has also had to take responsibility for replanting, due to maladapted trees dying. Yet the 20 per cent of the funds that should have been disbursed to the community three years after the contract was signed in 1998 have still not been received. And the plantation has to be maintained for nearly 15 more years until harvest. To top it off, if the community decides not to continue carrying out PROFAFOR's plantation work at that time, it must hand over 30 per cent of the income from the sale of the timber to the company.

In a workshop conducted with SigSig residents, an attempt was made to draw up a balance, showing how much the community had gained and lost from its agreement with PROFAFOR, although much of what the community put into the plantations cannot be satisfactorily quantified, such as the *minga* and the work of the community leaders. Calculations were made for plotting, dibbling, firebreaks, right of way, replanting, seedlings, maintenance, management, training and so forth.

The community concluded that, even without taking account of the value of the environmental liabilities the project has saddled local inhabitants with, or the cost of the plantations for another 15 years in terms of labour, inputs, insurance, security, tools, harvest and timber marketing, its losses already amount to over USD 10,000.

Isn't there anything the community can do to save the situation?

PROFAFOR has a lot of power in this context. Once a contract is signed, there isn't much communities can do to modify it, even when, as in SigSig, the agreement with the company was signed by only 50 community members when there were over 200 registered.[20]

PROFAFOR can even claim payment of compensation if its staff decides that a community has not fulfilled its obligations. This compensation can amount to up to triple the original payments to the communities, or many tens of thousands of dollars (see Table 6, below).

One villager reported: 'When I told the engineer Franco Condoy that we wanted to undo this agreement, he told us: "You cannot rid yourselves of the agreement, the commune is mortgaged."'

According to Ecuadorian law, Condoy is wrong. Communal property of indigenous communities is not subject to mortgages or land tax. Mortgages can only be contracted with private estate and landholders, individuals or corporate bodies.

'We made an assessment and…it was like a bucket of cold water. On doing our accounts, we realised how much money we have put in, and the trees are still small…Although we have no money left…we have to look for a warden to look after the plants and pay him, we have to prune, we have to put down manure, all the care and then the harvest…we ourselves have to find a [timber] market… How is that?! We are depleting our land, we are providing labour, doing harvesting and also giving 30 per cent.'

SigSig community member

Table 6. Penalty amounts in relation to paid and offered amounts

Source: PROFAFOR Forestation Contracts

Communities	Amounts initially offered (USD)	Amounts disbursed to community	Amounts of penalty clause	Penalty/ disbursement ratio
Caguanapamba	n.a.	$15,716	$42,660	271%
San Sebastián de SigSig	$75,600	$38,800	$108,000	278%
Pisambilla	$49,500	$27,000	$81,000	300%
Mojandita Avelino Dávila	$21,450	$11,700	$35,100	300%

In practice, however, Condoy is right, since even contracts involving common property are subject to penalty clauses and fines in the event of a breach, and PROFAFOR is well able to enforce mortgage-like arrangements by taking advantage of the inter-ethnic power relations that are a legacy of the colonial era in the region.

In one community, Caguanapamba, where the leaders who had signed the contract mismanaged the PROFAFOR funds they were entrusted with, community members did not get paid for the first planting operation and many seedlings were lost. The leader who succeeded them will now have to use the last instalment of funding in order to pay off the people who did the original planting. To complete the firebreak, he has had to rent a machine with community funds and rely on labour from *minga*.

All right, I can see that things haven't all gone according to plan with carbon sinks in the Andes. But so what? Can you draw any general conclusions from all this?

Carbon trading theory says that Southern countries have a hitherto unrecognised and unpriced resource in the form of spare or unused carbon-absorbing potential. By bringing this dormant, unexploited resource into something called 'the market', the theory goes, the South will be able to transform it into living capital or exchange it for cash or other things, adding to its wealth and to that of world society as a whole.

Over hundreds of square kilometres of the Ecuadorian Andes, new transactions involving carbon are indeed being made. But for the most part, they are not textbook 'market' transactions, nor do they address climate change, nor have they resulted in communities' realising new value from formerly unused assets.

Instead, common land, community labour and much of the paltry

but crucial savings of peasant communities have been transferred to a private firm for production of a new commodity which, although largely notional, has the material effect of shoring up an anachronistic pattern of fossil fuel use in The Netherlands. While claiming to 'absorb' carbon, PROFAFOR has in fact been absorbing Andean wealth while helping to enlarge the North's ecological footprint in the South. Indirectly, it is also transferring wealth from future generations to the present, through its failure to address climate change.

The section on Ecuador is extracted from the research of Patricia Granda, who studied the FACE-PROFAFOR project for Accion Ecologica, an Ecuadorian NGO, and the World Rainforest Movement.

The mechanisms that have done the real work in making this transfer possible are not the abstract, benign 'wealth-creating' trade mechanisms of economics textbooks. On the contrary, they are mechanisms that compel, discriminate, narrow choices, increase dependence, reduce transparency, and centralise power and knowledge in bureaucracies and expert institutions – just the sort of thing that 'markets' are commonly seen as combating. These mechanisms include:

- Unfamiliar tree species planted in exclusive monocultures and requiring extensive technical intervention.
- Non-transparent and exploitative written legal contracts backed by historically-ingrained unequal power relations, through which a private company retains 100 per cent of the carbon sink credits from plantations while local communities take on debt and responsibilities for maintenance and managing environmental impacts.
- An internationally disseminated discourse, according to which the lands to be used for plantations have been 'degraded' by excessive use and cannot be 'profitably' used for subsistence activities such as cattle-raising.
- Expert procedures of 'verification' of carbon flows that by their nature are resistant to public scrutiny.

One last technocratic mechanism that makes PROFAFOR's manufacture of carbon credits possible is 'forest certification', a seal of environmental and social approval that was granted to 20,000 ha of PROFAFOR's plantations in 1999 by the Forest Stewardship Council (FSC). The FSC is an independent international body with membership from both industry and NGOs, but the actual job of deciding whether a plantation meets FSC standards falls to private firms hired by the plantation company. In PROFAFOR's case, this was the Societé Générale de Surveillance (SGS), which has also certified PROFAFOR's carbon sequestration.

These certifications reassure buyers who will never visit the Andes that PROFAFOR's product is a valid, environmentally-friendly commodity from plantations that 'strive to strengthen and diversify the

local economy' and 'maintain or enhance the long-term social and economic well-being of forest workers and local communities'.

Ironically, the SGS certifiers noted as one of PROFAFOR's strong points the 'participation of local communities in decision-making', as well as PROFAFOR's continued 'commitment' to use native species.

Local communities' lack of power to object to such claims helps lubricate PROFAFOR'S international trade in carbon credits. No community member interviewed by Patricia Granda in 2004 even knew of the existence of the FSC, nor of its Principles and Criteria, nor how they might be enforced. Here, too, environmental markets have failed to live up to their image in economics textbooks.

The story continues – Carbon forestry in Uganda

One thing can be said for the US-Guatemala carbon trade mediated by CARE described in a previous section: it at least *attempted* to square the production of carbon for the North with local social goals. It would be difficult to say the same for a Norwegian project to grow carbon credits in Uganda that started up a bit later. Journalist Harald Eraker, who investigated the project, labelled it as a case of 'CO_2lonialism'.[21]

The Uganda project was closely tied to the construction of conventional gas-fired power plants in Norway by Naturkraft and Industrikraft Midt-Norge corporations. The plants were supported by Norway's Labour Party, Conservative Party and Progress Party on the ground that they could be made environmentally-friendly through the purchase of carbon credits.

Some of these credits were to be provided by Tree Farms, a Norwegian forestry company operating in Africa. In 1995, Tree Farms (or Fjordgløtt, as it was then called) had received a grant from NORAD, the Norwegian aid agency, to explore the scope for activities in East

Africa.[22] The following year, the company set up in Tanzania and Uganda, and, later, in Malawi as well. In Uganda, it obtained from the authorities an extremely low-cost 50-year lease on 5,160 hectares east of the town of Jinja in the Bukaleba forest reserve on Lake Victoria, which it planned to plant mainly with eucalyptus and fast-growing pines. Bukaleba is one of more than 700 large and small state-owned central forest reserves set aside for forestry and forest protection, covering in all 7 per cent of the land area of Uganda.[23]

Shortly after the Kyoto Protocol was adopted in December 1997, Fjordgløtt increased its capitalisation and invited outside investors to buy shares. By 2000, Tree Farms controlled at least 20,000 hectares of land in the region and was in the process of acquiring a further 70,000 in Tanzania (see box on page 242: 'The Money Came from a Place Far Away': Tanzanian Land, Norwegian Carbon). The firm had planted 600 hectares, mainly with fast-growing pines (*Pinus caribaea, P. oocarpa, P. tecunumani*) and eucalyptus (*Eucalyptus grandis*), with Industrikraft Midt-Norge securing a first option on the associated carbon credits.

Norwegian journalist Harald Eraker investigated early attempts by Norwegian power and forestry firms to sequester carbon on Ugandan land.

What does the Ugandan government get in return for turning over its land to this company for 50 years?

It gets a one-off fee of USD 410 and an annual rent of about USD 4.10 for each hectare planted with trees. The rent, paid in fast-depreciating Ugandan currency, is adjusted every 10 years according to the index of inflation as defined by the Bank of Uganda. No rent is paid for areas that the companies have not planted with trees. For six square kilometres of plantation established by 2001, then, Tree Farms had paid Uganda, when inflation is factored in, less than USD 11,000. For 50 years' use of the same area of land, given current rates of inflation, it was set to pay less than USD 110,000.

That's outrageous!

Yes. Several years after the deal was made, the deputy commissioner for forestry in the Ministry of Water, Lands and Environment, Ignatius Oluka-Akileng, told NorWatch, an independent news service monitoring Norwegian business activities abroad, that the authorities had recently realised that investors were 'taking advantage of the system' to get cheap land.

The fact that no rent is paid for areas not yet planted with trees makes such arrangements particularly attractive to land speculators. Yet it has proved hard for the Ugandan authorities to negotiate better terms. According to one reliable source, when Ugandan officials tried

to negotiate a higher rent for 12,000 hectares in the Kikonda forest reserve with the Institut für Entwicklung und Umwelt, a German company headed by a former politician in the European Parliament, the company refused, saying: 'Our plane to Germany leaves tonight; if you don't sign now, there will be no deal.'

One problem is that forest authorities often simply don't know how much foreign companies might profit from carbon trading (see box on page 271: No Need to Know? The Secret Economy of Carbon), or how long they plan to keep plantation land out of other uses to ensure that carbon continues to be stored on it. Forest authorities, to say nothing of local people, are also poorly equipped to confront ministers, politicians and government climate negotiators who take advantage of their position and inside knowledge of European corporate and governmental carbon plans to get funding that helps them gain control of 'degraded' state forest land.

Well, it's not as though the land is being used for anything else.

Actually, it is. Since the 1960s and 1970s, local farmers and fishermen have moved in and out of Norwegian as well as German concession areas in Bukaleba. In fact, many people had migrated into the area already by the early 20th century. Although an outbreak of sleeping sickness then caused people to flee, when the tsetse fly vector was brought under control in the 1970s, people moved back to Bukaleba, and Idi Amin authorised a cattle-herding project in the middle of the reserve. Politicians under the Milton Obote regime in the 1980s also supported settlements in the forest reserve, one minister observing that 'trees don't vote, but people do.'[24] People were once again evicted in 1989–90. Crops were destroyed and houses torn down. Most evictees settled just outside the borders of the forest reserve, but then slowly started venturing back into the reserve to farm and fish. By 2000, five fishing and farming villages were inside the Tree Farms area in the Bukaleba forest reserve, and people from at least eight villages outside the reserve were cultivating the earth on Tree Farms' lease. Iganga district, the location of the reserve, was densely populated with migrants from other parts of Uganda, as well as from neighbouring countries. With scant opportunities for work outside agriculture, and with growing numbers, pressure on land was strong.[25]

But these people must be there illegally.

According to state law, yes. But some farmers claim that they are the rightful owners, having bought the land they are now working back in the 1980s, or that the land they are farming has been owned by their family for generations.

In 2000, forest authorities told Tree Farms that farmers and fishermen living in or using the Bukaleba reserve had been served notice to vacate.[26] Tree Farms' managing director had left the job of evicting farmers to the authorities, stating that the company would not do 'the dirty job of throwing them out' itself.

Apart from the people from the fishing village Walumbe Beach, however, no one interviewed by NorWatch in 2000 said that they had been given notice to leave the reserve. Several had heard rumours about it, while others were clearly surprised at the news. Some hoped that they might be allowed to stay – a hope perhaps based on the fact that the environmental impact assessment comes close to recommending that fishermen be allowed to stay to avoid social unrest.[27] Almost every farmer and fisherman told NorWatch that they had no other place to go, let alone land to farm. All expressed fears for the future, and asked NorWatch to convey to the Norwegian owners of Tree Farms their request that they be allowed to stay, or at least to farm or fish in the reserve.[28]

'When the UWA people came with their tree-planting activities, they stopped us from getting important materials from the forest. We were stopped from going up to get malewa *(bamboo shoots), which is a very important traditional food in the area and is a source of income. There were certain products that we used to get from the forest for the* embalu *ceremony (circumcision ritual) to be performed in the proper traditional way.'*

Cosia Masolo, evicted village elder and father of 20 now living on a 0.3 hectare piece of land in Mabembe, Buwabwala sub-county

Can't Tree Farms provide jobs for local people to do?

Tree Farms originally employed several hundred people to manage the Bukaleba plantations. In 2000, however, only 43 were left, according to the assistant administrator at the company's forest station, with only 20 working on the plantations themselves.

Tree Farms did allow farmers to grow maize, beans, and other products between the rows of planted trees during the first few years, until the trees grew too high for other plant life to grow beneath them. According to an EU-supported study, however, this scheme 'resembles a Middle Age feudal system but without the mandatory "noblesse oblige" and with the farmers paying for the bulk of the investment cost of the plantation establishment'.[29] Local farmers clear, plough, weed and manage the plantation areas, providing free labour for ground clearing and weeding.[30] Many farmers reported having to pay the firm cash or a share of their crop to be allowed to farm on the company's lands. One extended family with five adults working on one acre told NorWatch that the previous year they had had to pay 100 kilograms of maize to Tree Farms out of a harvest totalling 250 kilograms.[31]

Conflicts over land and unpaid labour were seen by several locals as threatening the project's future as a provider of both wood and carbon credits. Farmers have reportedly over-pruned trees, uprooted seedlings, and neglected weeding in efforts at surreptitious sabotage.[32] The Ugandan forest authorities, meanwhile, reprimanded Tree

Farms for low technical standards and demanded that the company 'do some real investment to produce quality tree stands'.[33]

The eucalyptus plantations have also suffered termite attacks. By 2001, the Tree Farms project was way behind schedule and suffering from lack of funds. To raise some quick money, the company was even forced to clear 50 hectares for commercial maize crops, arousing further criticism from the forestry authorities.

But is the project at least storing some carbon?

Tree Farms' original management plan called for their plantations in the Bukaleba reserve to cover some 4,260 hectares of the company's total area of 5,160 hectares by 2005. The firm anticipated being able to sell 500 tonnes of CO_2 credits per hectare, or 2.13 million tonnes of carbon dioxide in all.[34] The accounting that resulted in this figure was wildly optimistic.

For one thing, proper carbon accounting for the project would require following around thousands of evictees, many of whom would probably have to clear land elsewhere, resulting in carbon emissions attributable to Tree Farms. This would be impossible, particularly in a country such as Uganda, where poverty, landlessness, and political instability keep people constantly moving from one end of the country to the other.

For another, advance sale of carbon credits would require that the long-term political future of Bukaleba be known in advance, so that any re-invasion of the area could be predicted and its effects on carbon storage precisely quantified and insured against or compensated for. No basis exists for deriving numbers of this sort.

The future investment climate for such projects would also have to be calculated, as well as the probability of fires; the ecological effects of plantations on local patches of native vegetation through hydrological or other changes; the soil carbon loss attributable to clearing, ploughing and erosion caused by the project.[35] Even to attempt to do all this would drive the costs of the project through the roof.

If the original easy numbers posited by Tree Farms were accepted by the market, however, they would translate into carbon profits of the order of USD 10 million, well over a dozen times Tree Farms' outlay on land. This would not include possible income from timber and wood sales. Turning Bukaleba into a Norwegian carbon plantation, moreover, would mean that its lands would not be available for long periods either for agriculture or for plumping up Uganda's own carbon accounts.

'The Money Came from a Place Far Away': Tanzanian Land, Norwegian Carbon

In addition to its project in Uganda (see main text), Norway's Tree Farms company was also, by 2000, trying to acquire savannah land totalling over 70,000 hectares in Tanzania. Between 1996 and 2000, some 1,900 hectares of trees were planted in Mufindi and Kilombero districts at about 2,000 metres above sea level, where a seasonally moist climate provided lots of water for thirsty industrial monocultures of *Pinus patula* and *Eucalyptus saligna*.

The land had been leased from the government at USD 1.90 per hectare per year for a 99-year period on condition that it be used solely for forestry. Industrikraft Midt-Norge, the Norwegian power utility, meanwhile signed an options contract to pay Tree Farms nearly USD 4.50 per tonne of carbon dioxide supposedly sequestered. Over a 25-year period, this would give Tree Farms a carbon profit of about USD 27 million for one plantation complex, Uchindile, compared to USD 565,000 paid to the Tanzanian government in compensation for losing the opportunity to do anything else with the land.

Yet according to Tree Farms Managing Director Odd Ivar Løvhaugen, the firm would have invested in Tanzania's forestry sector regardless of possible carbon money. Løvhaugen emphasised that the company considers any trade in carbon credits merely as a supplement to those from conventional forestry. The Tree Farms carbon project would thus be in breach of the requirements for carbon projects outlined by the Kyoto Protocol, which disallow credits from activities that would have been undertaken without special carbon finance.

Promising various social benefits, the company had succeeded in overcoming villagers' reluctance to cede their uncultivated land to the project, but in the end pledges to provide health and education services were not kept. Up to 500 local villagers were hired to plant and nurse the trees, build roads, or watch over the plantations. But planting took place only between December and March, so the work could not replace agricultural or animal husbandry occupations. In addition, the promised wage was too low – USD 1 a day, less than the government's recommended minimum – for anything other than daily subsistence. Many workers were not paid at all. Some workers interviewed by NorWatch in 2000 had eight months of wages owing to them.

'When we asked about the salaries', commented the residents of Uchindile village, 'the company told us that the money came from a place far away and that there was nothing that could be done about it'.

Source: Jorn Stave, NorWatch/The Future in Our Hands, 'Carbon Upsets: Norwegian "Carbon Plantations" in Tanzania', in Friends of the Earth, *Tree Trouble*, Friends of the Earth, Asuncion, 2000.

In sum, the project was not just a 'lose-lose' initiative for forestry and local people, as concluded by the EU-funded study,[36] but in fact a 'lose-lose-lose' state of affairs. The forestry effects of the scheme were

unhealthy, local villagers were suffering, and, as Trygve Refsdal, advisor to the Ugandan forest authorities, warned, Uganda was in danger of being subjected to a 'new form of colonialism':

> Forest-planting in Uganda and other poor countries must, firstly, aim to meet the needs of the country and the local people, not the needs of the "international community." If these can be combined, it's OK, but experience from similar initiatives show that local interests, local needs, and traditional land rights are easily pushed aside, and that land conflicts arise when outside commercial interests enter.[37]

Growing international criticism ultimately prevented Tree Farms from claiming carbon credits for the project. But trees continued to be planted. After lengthy negotiations, the Norwegian owners conceded a little under 5 per cent of the land they had leased from the government to local people, but locals complained that they were still paid badly and that most of the labour was not sourced locally.

But perhaps the Tree Farms experience will lead to less exploitative arrangements in the future.

'The biggest problem is how to secure food for the family. All our gardens, where we used to get food, have been taken over by the park rangers'.

Amina Gidongo, widow and mother of seven children living in a cave as a result of having been evicted

Sadly, the evidence suggests otherwise. The international carbon economy has since played a big part in stimulating land grabs by private developers in Uganda's state forests. In 2003, several officials of the Ugandan government, including not only former vice-president Dr Specioza Kazimbwe but also officials familiar with the international climate negotiations, received large concessions for land suitable for afforestation and reforestation, while communities applying for concessions were left empty-handed and may be excluded from access to the forests in the future.

In addition, a carbon project of the Uganda Wildlife Authority (UWA) and The Netherlands's FACE Foundation[38] to plant trees in a national park has contributed to a raft of social and environmental problems.

Not again!

I'm afraid so. The idea sounded innocent enough: to plant mainly native trees in encroached-upon areas inside and along the 211-kilometre-long boundary of Mount Elgon national park near the Kenyan border. In 1994, FACE undertook planting of 25,000 hectares and in return was given rights over the carbon supposedly sequestered – expected to amount to 2.11 million tonnes of CO_2 over 100 years.[39] UWA's role was to manage the plantations, protecting biodiversity, safeguard park borders and so on. In 2002, certifiers for the Societé Générale de Surveillance (SGS) found that a bit over 7,000 hectares had been planted.

As documented by Timothy Byakola of the Ugandan NGO Climate and Development Initiatives, no one denies that the project has had some good effects. It is acknowledged by locals as having improved regeneration on the boundaries of the park, particularly in areas that had been badly encroached on by agriculture, and as having increased streamflow from the forest. In 2003, the UWA-FACE project was even certified by SGS as a well-managed forest according to Forest Stewardship Council (FSC) principles (for more on the FSC, see 'From The Netherlands to the Andes – A tale from Ecuador' on page 247 and 'Brazil – Handouts for repression as usual' on page 302).

But according to local council officials, the project employs few people, and even then only during the planting period. And the evictions have made many homeless and hungry. In 2002, for instance, 300 families were evicted from disputed land by park rangers in Wanale, Mbale district. Complaining that they had lived on the land for 40 years, with some even holding government land titles, the families said that they were forced to seek refuge in neighbouring villages where they now live in caves and mosques. Fires have to be kept burning the whole night in the caves to protect against cold, and school-going children have had their studies disrupted. Dodging armed ranger patrols, children slip back to their families' former gardens to steal what they regard as their own food. Local people have lodged a case seeking compensation for destroyed property and the return of their land with the Mbale district court.

Hundreds of families have also been evicted in other locations, increasing social tensions.[40] In 2003, villagers disgruntled at UWA's militarised approach destroyed over 400 hectares of eucalyptus plantations in one night. In February 2004, *New Vision* newspaper reported that police were holding 45 people 'suspected of encroaching on Mount Elgon national park and destroying 1,700 trees' planted by the UWA-FACE Foundation project.[41] At a November 2004 community meeting held in Luwa trading center, Buwabwala sub-county, evicted locals insisted that they would go back to the forest rather than face starvation. The park warden, for his part, promised that anyone caught in the forest would be shot.

'The boundaries were made unilaterally, displacing over 10,000 people. The wildlife people who operate the park are very militarised, and have killed over 50 people. People feel that the government favours animals more then the people.'

David Wakikona, Member of Parliament, Manjiya[42]

In fact, so tense has the atmosphere become that Members of Parliament from eastern Uganda have appealed to the government to degazette Mt Elgon's boundaries to ease the suffering.

But maybe a little short-term pain was necessary in order to preserve the forest and its carbon.

But what else gets destroyed in the process? It's not just a matter of

Recent carbon forestry initiatives in Uganda have been researched by Timothy Byakola of the Ugandan NGO Climate and Development Initiatives.

temporary social dislocation, but also farmland shortages, environmental damage outside the park, and disrupted relationships between local people and the forest.

Today, with a population density of over 450 people per square kilometre in the farmlands around Mbale town and 250 per square kilometre in Kapchorwa district, the village areas bordering Mount Elgon national park are the most densely populated in Uganda, partly due to UWA evictions. Communities living close to the forest mainly grow food crops such as bananas, yams, sweet potatoes and vegetables at bare subsistence levels with few surpluses remaining for sale in local markets. Production of a few cash crops such as coffee and wheat is fast dwindling due to fragmentation of land. A typical peasant holding in the area averages between 0.25 and 1.0 hectares, with a household having an average of 10–15 members.

One result is that soils are quickly losing fertility. Most trees and other vegetation in the villages outside the park have been cut to provide fuelwood for cooking and building materials, leaving open denuded slopes. Deforestation has left land open to erosion as more areas are being converted to agriculture. In 1996, a one-kilometre landslide killed nine people in Budesi and Buwali parish, and during the heavy rains of the 1997 El Niño, another five by landslides in Bunabokha village in Budesi parish. Many locals are concerned that rivers flowing from the mountain are now carrying higher sediment loads, especially during rainy seasons. Communities and community development organisations note that fisheries have suffered.

All this is due to there being too many people. That's not UWA-FACE's fault.

It's not so simple. Land scarcity in the area is partly a result of the 'encroachment' of the national park on longstanding farmland, and the hand of the eviction authorities has unquestionably been strengthened by the project.

Social networks have also been endangered when UWA cuts off villagers' access to intact forest and its animals, bamboo shoots, firewood, mushrooms, vegetables, herbs, medicines, building materials, and wood used in circumcision ceremonies. In Bubita sub-county, council officials reported that firewood is now hard to find and that people have resorted to using banana leaves to prepare food, meaning they can no longer eat foods that require long cooking, such as beans. Goats and cows have to eat banana stems because the forest where they used to graze on grass is now a no-go area. In Buwabwala, many young girls are crossing over to neighbouring Kenya to earn money to buy land for their parents. Some have moved into prostitution and contracted HIV.

But hasn't the project improved the economy of the region?

Locals indignantly reject FACE Foundation claims that the project has increased incomes, improved standards of living work, provided jobs in planting and nurseries, and given out seedlings for villagers to plant on their farms.

A Funny Place to Store Carbon: Land Disputes at Mount Elgon

Mount Elgon was first gazetted as a Crown Forest in 1938 and became a central forest reserve in 1968 and a national park in 1993. But the area has a long history of human occupation and use. Already in the 1930s, many families were living within the boundary, with about 70 heritable licences issued to families living and cultivating the forest reserve. In 1954, when the first working plan for Mount Elgon forest reserve was written, there were still around 30 licensed families living there.

Forest boundaries were originally marked by holes. In 1962, the forest was resurveyed and live boundary markers, including trees of exotic species, were put in place. However, the boundaries were not plotted on the national land grid, making it hard later on to establish where they had been when the markers were destroyed.

Between 1970 and 1985, during an era of breakdown of law and order, high levels of industrial timber exploitation and confused forest policy, some 25,000 hectares of prime high montane forest between 2000 and 3000 metres in altitude were destroyed or degraded through clearing for agricultural activities. Pit-sawing combined with swidden cultivation reduced the densely-forested lower slopes to barer landscapes colonised by Kikuyu grass (*Pennisetum clandestinum*).[43]

In 1993, Mount Elgon was designated as a national park. But local people were not consulted, in violation of the law. Families found inside the 1963 boundaries – some of whom had occupied the land for over 40 years – were given nine days to vacate, despite the understanding among many of them that the land was theirs and that such arbitrary evictions are in breach of land laws as well as the subsequent 1995 Constitution, which recognises customary ownership.

In August 2003, the Uganda Land Alliance started proceedings against the Attorney General and the UWA on behalf of the Benet people (also known as Ndorobo), who are indigenous to Mount Elgon. The Benet, who had been evicted in both 1983 and 1993, had decided to take the government to court to claim their land rights, and accused the UWA of harassment. The government cut off education and health services to the area and forbade local people from working the land. In October 2005, however, Justice J.B. Katutsi ruled that the Benet people 'are historical and indigenous inhabitants of the said areas which were declared a Wildlife Protected Area or National Park'. Katutsi ruled that the area should be de-gazetted and that the Benet should be allowed to live on and continue farming their land.[44]

Costa Rica – 'Environmental services' pioneer

Costa Rica has always been one of the countries in Latin America keenest to host carbon forestry projects and other 'environmental services' market schemes. In the mid-1990s, looking for new ways to derive value from its forests, it decided to become the first country to bring its own government-backed and -certified carbon forestry credits into the global market,[45] and even before Kyoto was signed was selling them to the Norwegian government and Norwegian and US corporations.

To work on the scheme, Costa Rica hired Pedro Moura-Costa, a Brazilian forester with experience in early Malaysian carbon forestry projects backed by New England Power of the US and The Netherlands' FACE (see 'From The Netherlands to the Andes – A tale from Ecuador' and 'The story continues – Carbon forestry in Uganda'). Moura-Costa in turn convinced Societé Générale de Surveillance (SGS), one the world's leading testing, inspection and certification companies, to use Costa Rica as a test site for learning how to make money as a carbon credit certifier. On the back of his own experience, Moura-Costa then set up a new carbon consultancy, EcoSecurities.

Also significant was an early Costa Rican project called CARFIX, implemented by the voluntary organisation Fundación para el Desarrollo de la Cordillera Volcanica Central and funded by US Aid for International Development (USAID), the Global Environmental Facility and Norwegian financiers. CARFIX earned its North American sponsors carbon credits by promoting 'sustainable logging' and tree plantations on 'grazed or degraded lands', claiming to provide local people with income they would otherwise have to earn through export agriculture and cattle production that endangers forests.[46] Following the emergence of the Kyoto Protocol in 1997, Costa Rica pushed for the certification techniques it had pioneered to be adopted around the globe, and signed further carbon deals with Switzerland and Finland.

Costa Rica's enthusiasm for carbon offset projects seems to suggest that there are a lot of benefits in this market for the South, after all.

The enthusiasm is not unanimous, even in Costa Rica. In fact, the boom in carbon forestry fits into an existing trend of support for monoculture tree plantations that has aroused concern among local environmentalists. Between 1960 and 1985, about 60 per cent of Costa Rica's forests disappeared due to cattle farming. Then there was a 'wood shortage' scare, and the government subsidised monoculture tree plantations extensively between 1980 and 1996. Helped by government incentives, over 130,000 hectares have been covered by the plantations over the past 20 years. By 2000, plantation monocultures covered over 3 per cent of Costa Rica's territory.

A typical ecosystem on which a Costa Rican plantation might be established. The carbon released from the standing trees, removed to make way for the plantation, often will not appear in project accounts.

The Clean Development Mechanism (CDM), Costa Rican environmentalists fear, may help spread the monocultures even further. In the late 1990s, a government official active in the climate negotiations helped promote a new law supporting monocultures. Half of a 3.5 per cent fuel tax went into an 'environmental service programme' designed largely to give incentives to private landowners to be 'green' in a country in which 20 per cent of the land is national parks, a few per cent indigenous territories and the rest private land. Under the programme, a landowner might get, for example, USD 90 per hectare per year to conserve forest, or USD 500 per hectare over five years to establish a plantation. In return, the state gets rights to the carbon in the plantation, which it can use to bargain with in international negotiations.

How much of this tax money goes to forest conservation, and how much to plantations?

Most payments under the environmental services programme go to forest conservation, but 20 per cent is used to subsidise monoculture plantations and agroforestry. This has provoked objections from ecologists, academics and indigenous peoples who argue that monoculture plantations, often lucrative in themselves, can damage the soils, water and biodiversity that the programme is supposed to protect. The programme may also soon be supported by a tax on water and electricity.

Still, 20 per cent is a pretty small proportion, isn't it?

Overall, Costa Rica is today putting USD 1.5 million annually into financing 4,000–6,000 hectares per year of new plantations. That may not seem much, but Costa Rica's total territory is only a bit over 5 million hectares. A UN Food and Agriculture Organization consultant's study has suggested that the country set up even more plantations, up to 15,000 hectares per year, using carbon money. Another study estimates that, during the period 2003–2012, some 61,000 hectares of monoculture plantations, or 7,600 a year, could be established in so-called 'Kyoto areas'. That's well above the current rate,[47]

implying that plantations could start competing aggressively for land that might otherwise be given over to secondary regeneration and conservation of native forest.

In addition, because CDM forestry projects, for economic reasons, would probably have to cover 1000 hectares and upwards (see below), they could well threaten the land tenure of people carrying out other forest projects in Costa Rica. The average landholding in the country is less than 50 hectares, with most parcels belonging to families.

Well, sacrifices do have to be made for the climate, don't they?

Ironically, one of the things that the Costa Rican case helps show is the impossibility of determining whether the climate would in fact benefit from a policy of pushing such projects. It also clarifies the problems of fulfilling the conditions set out in the Kyoto Protocol[48] for reforestation and forestation carbon projects.

Take, for example, a study on carbon projects done by the Forest and Climatic Change Project (FCCP) in Central America, jointly executed by the Food and Agriculture Organization of the UN and the Central American Environmental and Development Commission (CCAD).[49] The study shows that available soil use maps are not precise enough to show how carbon storage in prospective carbon sink areas (or 'Kyoto areas') has changed since the 1990s, and are also hard to compare with each other. That would make accounting for increased carbon storage over the period impossible.

The study also suggests that it would be impossible to show to what extent Kyoto carbon projects were additional to 'those that the country implements as part of its forestry development projects': 'it is not possible to predict in what exact proportion these activities will be in or out of the Kyoto areas and any assumption in this respect is enormously uncertain'. In addition, Kyoto carbon projects could find it hard to factor out the anthropogenic activities to encourage natural seed nurseries that are being promoted and funded without carbon finance.

Above all, the FCCP study reveals the conflict between convenience and accuracy in measuring carbon. Measurements of soil carbon before and after the start of any carbon forestry project, it says, would be too costly, even though such measurements are a key to carbon accounting for plantations, which disturb soil processes considerably.[50] Similarly, the study accepts for convenience a blanket carbon storage figure of 10 tonne per hectare for grassland sites that could be converted to carbon forestry. However, Costa Rica boasts too wide a variety of grasslands and agricultural systems – most of them comprising a lot of trees – for such a figure to be used everywhere.[51]

But can't you cover such unknowns just by taking the amount of carbon you think you might be sequestering and reducing the figure by a certain percentage, just to be on the safe side?

That's what many carbon accountants do. The FCCP study, for example, suggests a 20 per cent deduction from the figure designating total potential of carbon sequestered to compensate for political and social risks and a 10 per cent deduction to compensate for technical forestry risks.

The problem with such 'risk-discounted' figures is that carbon sequestration is characterised by far more than just risk (see Chapter 3). Uncertainty and scientific unknowns are other realities that biological carbon accounting has to cope with.[53] In these conditions, it's impossible to be sure whether any particular numerical risk factor is conservative enough to compensate for the unknowns involved.

In Costa Rica, for instance, most monoculture tree plantations are less than 20 years old, with a trend towards planting just two species – *Gmelina arborea* and *Tectona grandis*. Pest or disease epidemics can therefore be expected, but their extent is incalculable. Furthermore, El Niño climate events may propagate enormous fires whose extent, again, cannot be calculated in advance. During the dry season of 1998, in the humid tropical zone where uncontrollable fires had never been reported before, over 200,000 hectares were burned. Part of this territory is under monoculture tree plantations. Given such realities, it's unsurprising that the FCCP carbon project study could give no reasons for its 'technical' risk figure of 10 per cent.

At present, there is also little basis for guessing how much carbon sequestered in Costa Rican trees will re-enter the atmosphere and when. The FCCP study simply assumes that 50 per cent of the carbon sequestered by a given project will remain so once the timber has been sold and used. However, the most common plantation species in the country (*Gmelina arborea*) is logged at least once every 12 years and most of the timber is used to manufacture pallets to transport bananas. The pallets are thrown away the same year they are made and probably store carbon no longer than a few years – though no one has done the empirical studies necessary to be sure.

The FCCP study also assumes that anthropogenic activities to foster natural seed nurseries will result in secondary forests that will be in place for at least 50 years. Accordingly, they make no deductions for re-emission of carbon. However, although current forestry law prohibits transforming forests into grasslands, both legal changes and illegal use could result in large re-emissions whose size would be impossible to determine in advance.

A 12-year-old plantation of *Terminalia* trees. The carbon released from eroded soils, such as appear in the photograph, is often missing in project accounts.

Fossil Carbon vs. Tree Carbon: Two Environmental Historians Speak

'Carbon cannot be sequestered like bullion. Biological preserves are not a kind of Fort Knox for carbon. Living systems store that carbon, and those terrestrial biotas demand a fire tithe. That tithe can be given voluntarily or it will be extracted by force. Taking the carbon exhumed by industrial combustion from the geologic past and stacking it into overripe living woodpiles is an approach of questionable wisdom... Eliminate fire and you can build up, for a while, carbon stocks, but at probable damage to the ecosystem upon the health of which the future regulation of carbon in the biosphere depends. Stockpile biomass carbon, whether in Yellowstone National Park or in a Chilean eucalyptus plantation, and you also stockpile fuel, the combustion equivalent of burying toxic waste. Refuse to tend the domestic fire and the feral fire will return – as it recently did in Yellowstone and Brazil's Parc Nacional das Emas, where years of fire exclusion ended with a lightning strike that seared 85 per cent of the park in one fiery flash.'[54]

Stephen J. Pyne, Arizona State University

'Undeniably, having more trees will work in the right direction – but to a minute degree. For its practical effect [on climate change], telling people to plant trees is like telling them to drink more water to keep down rising sea-levels.'[55]

Oliver Rackham, Cambridge University

To try to overcome such problems, the Global Change Group of the Tropical Agronomic Centre for Research and Teaching (CATIE), has been studying ways of putting non-permanent biological carbon in the same account as fossil carbon emissions, so that the two can be added and subtracted.[56]

One proposal is called 'tonne-year' accounting. The first step in tonne-year accounting is to determine the period that a tonne of carbon has to be sequestered in order to have the same environmental effect as not emitting a tonne of carbon. Because the lifetime of greenhouse gases in the atmosphere is limited, this time period should be finite. If the 'equivalence factor' is set at 100 years, then one tonne of carbon kept in a tree for 100 years and then released to the atmosphere is assumed to have the same environmental effect as reducing carbon emissions from a fossil-fuelled power plant by one tonne.

The second step is to multiply the carbon stored over a particular year or decade by the complement of this equivalence factor to find out what the climatic benefits are of that project for that year, and to limit the carbon credits generated accordingly. So the forestry project doesn't have to be permanent to generate carbon credits; it will just generate fewer credits the more short-lived it is.

Trust Me, I'm a Doctor: Three Professionals on How to Measure Carbon Offsets

'…I've often asked myself, when I've been flying in an aircraft, and I've flown over complex landscapes…how the hell can you measure carbon down there to a few per cent? The people that measure the carbon, either by satellite measurements or by flux towers, or by, sort of, sort of looking at the forest…all claim that within some reasonable degree of accuracy or precision you can do it. But when I look down on a complex landscape, I have to be honest, it's…um…I get very impressed if these guys are indeed correct. But, hey, the fact that when I look down in an aircraft and I think its going to be complicated, that's my gut instinct versus the scientific community's. And they claim they can demonstrate what precision and accuracy they can get… One has to go with what these scientists are saying.'[57]

Dr Robert T. Watson, Ex-Chairman, Intergovernmental Panel on Climate Change, interview with Cathy Fogel, Washington DC, 6 October 2001

'If you know that saving the Amazon is better for the atmosphere than keeping one car off the road, then you ought to be able to calculate how many cars are equivalent to saving the Amazon. The calculations may be difficult, but I don't see why the problems should be insurmountable.'[58]

Dr Richard Tipper, Edinburgh Centre for Carbon Management

'Baselines are not a question of imagination. At the International Centre for Research in Agroforestry, we have developed a method for monitoring and evaluation of environmental and development projects that involves project baseline measurement for any response variable that one deems important (e.g. household income, adoption of improved farming technologies, etc.). This same method could easily be used for carbon accounting and take the guesswork out of 'without-project' baselines, additionality and leakage. The simple solution to a problem that has been overcomplicated in the debate is: just measure it! It is really not that hard. Environmental monitoring is a mature field and rigorous methods exist for attributing project impact.'[59]

Dr Louis Verchot, Lead Scientist for Climate Change, International Centre for Research in Agroforestry

You still haven't mentioned any problems.

The first problem is that you still have to measure the carbon stored by a project over a particular year or decade. That runs into the same problems with ignorance, uncertainty and all the rest mentioned above. Second, no one knows how long the 'equivalence time' should be. Figures ranging all the way from 42 to 150 years have been mentioned.[60] Another difficulty is that even if one settles on a figure of,

A new teak plantation near the San Carlos River in northern Costa Rica. Exposed soil heated by direct tropical sunlight is likely to release significant quantities of carbon.

say, 100 years, it does not necessarily follow that carbon sequestered for 10 years will have one-tenth the climatic effect of carbon sequestered for 100 years. Again, the problem is not that any given patch of trees is temporary, but that there's so much uncertainty and ignorance about how to measure its relevance to climate. It's not a matter of calculable 'risk', but something far more recalcitrant to market accounting.

In addition, tonne-year accounting can make what allowances it does make for uncertainty only at the cost of generating carbon credits slowly. That makes it unattractive to business. It also militates against small projects. The CATIE study found that at prices of USD 18 per tonne – more than actual prices as of 2006 – the tonne-year methodology would allow profits only in projects of over 40,000 hectares.

Then there is a method called 'average storage adjusted for equivalence time' (ASC), which generates credits more quickly.

A Costa Rican acacia plantation. The logs in the foreground have been discarded and left to rot. In a few years, they will release all their carbon back to the atmosphere.

Other methods include the UN's 'temporary' Certified Emissions Reductions (tCERs), which expire at the end of the Kyoto Protocol's second commitment period and must be replaced if retired for compliance in the first commitment period; and 'long-term' credits (lCER)s, which expire and must be replaced if the afforestation or reforestation project is reversed or fails to be verified. None of these approaches, however, address the basic problems of uncertainty and ignorance described in Chapter 3. In fact, not even the atmospheric lifetime of carbon dioxide emissions can be pinned down with any precision, as mentioned above. For business, this translates into accounting headaches and high economic risk.

In the end, CATIE came to the conclusion that CDM forestry projects had to be big in order for it to be worthwhile to fulfil all the accounting and other requirements. Out of a total of over 1,500 simulated scenarios, only 8 per cent made it possible for projects under 500 hectares to participate. The mean size of a profitable project was 5,000 hectares. One way out would be to bundle smaller projects together and employ standardised assumptions and procedures, but again that would magnify accounting mistakes and also would be hard to achieve, given the Costa Rican land tenure system.

You've talked a lot about how much harder it is to measure how much carbon is sequestered in tree projects than simply to keep fossil carbon in the ground. But maybe we don't need to compare carbon sequestered in trees with carbon stored in fossil deposits. We should think of forestry carbon projects like Costa Rica's as replacing carbon released from forests, not as replacing carbon released from fossil fuel combustion. This should solve the measurement problem, since all we have to do is compare biotic carbon with other biotic carbon.

No, the same problems hold: how do you quantify carbon savings against an unspecifiable baseline, given the biological and social unknowns governing carbon flows in the above-ground systems? (See Chapter 3.)

Yes, climate change can be addressed by trying to conserve forests just as it can be addressed by keeping fossil fuels in the ground. But it can't be verifiably addressed by burning forests and then 'compensating' for this burning with biotic projects, any more than it can be verifiably addressed by mining fossil fuels and then 'compensating' for the associated carbon transfer to the biosphere with biotic projects.

What's the future for Costa Rican carbon forestry projects?

The government has recently declared that it will put more effort into non-forestry projects such as windmills and hydroelectric schemes, on the grounds that they are less complicated and yield higher-priced carbon credits. On the other hand, companies such as the US-based Rainforest Credits Foundation[61] continue to be eager to set up new carbon schemes in Costa Rica, often without much prior consultation with the government.

Research for the section on Costa Rica was done by Javier Baltodano of Friends of the Earth, Costa Rica.

India – A taste of the future

If countries in Latin America pioneered carbon projects, one of the countries to attract the most long-term interest among carbon traders and investors has been India.

By August 2006, the country led all others in number of CDM projects registered with 82, followed by Brazil with 58.[62] Many more are in the pipeline.[63] The Indian government is also pressing for nuclear power and large hydroelectric dams to be allowed to receive CDM funding, and, according to some observers, hopes to use carbon money for developments in the country's Northeast that would dispossess local people of water, land and forests.[64]

With about 350 projects at various stages of registration, the poten-

tial for non-plantation CDM projects is estimated by one source at more than 170 million tonnes of carbon dioxide equivalent per year, including 90 million tonnes from renewable energy schemes, while the potential yield of land-use and plantation projects is put at about 78 million tonnes of carbon dioxide equivalent annually.[65] A CDM National Strategy Study predicts that India could take 10-15 percent of the global CDM market.

As social activist Soumitra Ghosh and researcher Hadida Yasmin explain, a 'friendly and indulgent' national CDM authority which 'clears CDM projects in India almost as soon as they are submitted', a ' "clean" and aggressive corporate sector', and a 'happy band of new-age national as well as transnational validators, consultants and project developers have made India a veritable paradise for CDM projects.'[66] News about CDM projects and the income they will supposedly generate is boosting stock prices in even some of the worst-polluting sectors, such as sponge iron (see below). Accordingly, many of the big names of the Indian corporate world – Reliance, Tata, Birla, Ambuja, ITC – are moving in, in spite of earlier apprehensions that market uncertainty and the complex procedures that CDM involves would put off big companies.

Some of these firms are coming up with smaller-scale projects in renewable energy and energy efficiency. At an ITC paper and pulp operation in Andhra Pradesh, for instance, six separate CDM projects are being arranged inside the same factory. Bundled hydro and wind projects—and biomass—are also industry favourites due to a less risky registration procedure. However, nearly 85 per cent of Indian carbon credits are being generated by only two projects. Both projects – set up by blue-chip corporations SRF in Rajasthan and GFL in Gujarat – destroy HFCs, which are extremely powerful greenhouse gases used in refrigeration, air conditioning, and industrial processes.[67]

Inevitably, social activists are raising questions about whether such one-off gas destruction projects provide 'any credible sustainable development' to local communities.[68]

Why shouldn't such projects be beneficial to local communities?

First, because HFCs are so bad for the climate, projects that destroy them can generate huge numbers of lucrative credits merely by bolting a bit of extra machinery onto a single existing industrial plant. As a result, there are no knock-on social benefits other than providing income for the machinery manufacturer and some experience for a few technicians. Second, such projects don't help society become less dependent on fossil fuels. They don't advance renewable energy

sources, and they don't help societies organise themselves in ways that require less coal, oil or gas. Third, by ensuring that the market for credits from carbon projects is dominated by large industrial firms, they make it that much more difficult for renewable energy or efficiency projects to get a foothold.

Don't such projects also provide perverse incentives for governments not to do anything about pollution except through the carbon market? If I were a government trying to help the industries in my country get masses of carbon credits from destroying a few HFCs, I would hesitate to pass laws to clean up HFCs. Such laws wouldn't make industry any money. In fact, they would cost industry. Instead, why not just allow the pollution to go on until someone comes along offering money if it is cleaned up?[69]

That's a question that's understandably going through the minds of government officials in many Southern countries (as well as of those of corporate executives in the North). As a result, it's not clear whether the CDM market is actually a force for less pollution or not.

Another danger is that HFC projects could undermine the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. While this Protocol mandates phasing out of HFCs in Southern countries by 2010, the CDM has now provided a perverse incentive to hike production of HFCs in order to cash in as much as possible on credit sales. Although the CDM board has raised the issue with governments, no decision has been made to limit the number of HFC credits or bar new plants from entering the CDM market.

But at least HFC projects don't do any harm to local people, right?

That's a matter of opinion. If the industry getting the credits is hurting local people, local people may well disagree with the project. Near Gujarat, at Fluorochemicals Limited, proprietor of one of India's first projects to be registered with the CDM, villagers complain of air pollution's effects on their crops, especially during the rainy season, and believe the plant's 'solar oxidation pond' adds to local water pollution.[72]

Villagers near another factory hoping to benefit from CDM credits, Rajasthan's SRF Fluorochemicals, believe that their aquifers are being depleted and their groundwater polluted, leading to allergies, rashes, crop failure, and a lack of safe drinking water.

What about other industrial projects?

One of the industries that is benefiting most from the CDM is the notoriously dirty sponge iron sector.

The Fate of Small Projects

The CDM's market structure biases it against small community-based projects, which tend not to be able to afford the high transaction costs necessary for each scheme (see Chapter 3). In India, for example, the Barefoot College has trained 20 – 30 solar engineers, who have installed grid solar power stations and solar lanterns across the country. Such projects 'have difficulty accessing CDM finance,' according to Bunker Roy of the College, due to the need for 'upfront financing' and 'bundling' projects together to save on transaction costs.[70]

Another project, the FaL-G Brick Project, aims to promote fly ash bricks as an alternative to burnt clay bricks in the Indian construction sector. Fly ash, a waste product from thermal power plants, is mixed with lime from the acetylene industry and gypsum from chemical plants to form a material for making bricks that requires less fossil energy than conventional materials.

The process is unsustainable in that it relies on a fossil fuel-intensive industry, whose lifespan it would extend through sales of carbon credits. In addition, fly ash poses a health hazard to the workers who handle it. The project thus adds to the numbers of people suffering health risks due to fossil fuels in two ways: by prolonging fossil fuel pollution around thermal power plants buying the credits, and by bringing a new group into contact with hazardous fly ash.

The FaL-G project would ordinarily be subject to the same market handicap as small solar projects, since the brickmakers to be included tend to be small operations and the 'volume of emission rights generated by an individual plant is clearly not sufficient to treat an individual plant as a separate small-scale CDM project'. The World Bank's Community Development Carbon Fund, however, has stepped in to make it possible to 'bundle' together hundreds of these tiny plants – located in states as distant from each other as Tamil Nadu, Karnataka, Orissa, Uttar Pradesh and Punjab – under a single project umbrella, streamlining costs.[71]

What's sponge iron?

Sponge iron is an impure form of the metal obtained from removing the oxygen from iron ore. Its manufacture requires a lot of water and energy supplied by gas or, more frequently, coal.

In what ways is it environmentally damaging?

In Chhattisgarh state, the most polluted in the country, sponge iron factories have contaminated drinking water and, by lifting huge quantities of water from rivers and irrigation canals, lowered water tables.[73] Sponge iron works, which are subsidized by the state, also cause heavy air pollution, often in breach of pollution control norms, affecting health and agriculture. As of 2005, 33 out of 48 sponge iron units in Chhatisgarh were operating without having obtained statutory clear-

ances from the state's Pollution Control Board.[74] According to a report of the State Pollution Control Authority, 36 of the units are in violation of environmental pollution laws. In Siltara area of Raipur district, land near 18 sponge iron units has become barren.[75] Government soil tests from 30 separate sites in various villages found the soil to be contaminated with iron, affecting crop yields. Stored paddy seeds fail to regenerate, and even 50 kilometres away, production has suffered. Vegetables grown in the area turn reddish due to excessive air pollution.

In the last eight years alone, 17,200 hectares were acquired for industrial purposes in the state, displacing many villagers. Entrepreneurs typically acquire their first parcel of land through official channels such as the State Industrial Development Corporation, which in turn acquires its holdings from private owners at below market rates. The entrepreneurs are then are able to buy adjoining parcels at bargain prices after the pollution from their factories renders them useless for farming. Sellers are often left with few resources to restart their lives elsewhere, and are seldom able to find employment at the factories. And many new plants are contemplated or under construction.

The internet face of Jindal Steel and Power. The reality is quite different.

It sounds like there are some serious problems with this industry. But that's a good argument for CDM involvement, isn't it? Isn't it the function of CDM to help clean things up?

Is the CDM helping to clean the industry up, or is it providing new finance and a pleasant image for a socially and environmentally damaging status quo? Let's look at the evidence.

Start with the biggest sponge iron operator, Jindal Steel and Power Ltd. (JSPL). JSPL runs what it claims to be the largest sponge iron plant in the world near Raigarh city, where it is developing not one but four separate CDM projects that have already been approved by India's government and validated. JSPL's carbon projects are likely to

make it one of the largest energy CDM operations anywhere in the world, generating many millions of tonnes of so-called carbon dioxide 'reductions'. Spread over 320 hectares, the plant has simply wiped out the once flourishing agricultural village of Patrapali, which it still gives as its address.

Concerned citizens and a voluntary organization have filed a case against JSPL in the state High Court over a proposed expansion of its existing facilities. City dwellers object to increasing air and water pollution and ill health. Rural dwellers are angry at losing their lands. JSPL's plans include a 20-billion-rupee expansion over three surrounding villages which, with a population of close to 3000, are located on fringe of mixed deciduous, sal, bamboo, and teak forests. Agriculture is a major occupation, and villagers are also engaged in the collection of non-timber forest produce. In 2005, villagers from 22 communities submitted written resolutions that they did not want to sell or donate their land to industry.

For more than a decade, villagers from 18 communities have also opposed a dam JSPL wants to build on the Kurkut river to cater to its needs for water and power, managing to halt construction when various village heads wrote to the Chief Minister. Having already lost 240 hectares of their revenue land to JSPL, farmers in Khairpur village in Raigarh are meanwhile refusing to surrender any more, and complain about musclemen and touts sent by JSPL to pressure them to capitulate. They are also concerned about a new reservoir JSPL is constructing that would inundate their entire agricultural area (which is irrigated and yields two crops a year) and force them to migrate in search of other work.

Aren't there ways of mediating between the factory and local villagers?

A public hearing on the JSPL expansion – mandated by Indian law – was scheduled for 4 January 2005. But local people's concerns and objections could not be heard, because JSPL brought a large number of supporters and the proceedings were disrupted. The meeting was rescheduled for 18 January 2005 and then 29 January. An alliance of local civil society organizations pointed out that both postponements were made without the statutory 30 days' notice period, and that the Hindi version of the report and executive summary had not been made available. In the event, no actual public hearing was conducted on 29 January, in spite of the fact that more than 10,000 people showed up. Instead, people were asked to queue up to register their complaints and opposition without interacting with the public hearing panel. The environmental impact assessment prepared for the expansion does not properly address the project's impact on local forests

or the dumping of solid wastes and fly ash and the associated heavy metal contamination of water sources. A 'no objection' certificate JSPL claimed to have obtained from the village council of Tamnar for a thermal power plant has meanwhile proved to be a forgery.

But surely JSPL must be an isolated case.

Unfortunately, no. Villagers are also protesting the officially-sanctioned acquisition of 21 hectares by Monnet Steel Industries, another CDM sponge iron beneficiary, in Singhanpur, saying that 'we will die but will not give up our land and homes'. In May 2005, Nalwa Sponge Iron, MSP Steel, Salasar Industries, Shivshakti Factory and Anjani Steels – all CDM beneficiaries – were issued a notice by the local forest officer regarding soot pollution damaging trees and crops. None of the industrial units in the area is following environmental laws of the country and the state, the notice said. All of the firms have seen resolutions passed against their land acquisitions in local village assemblies.[76]

MSP Steel, whose CDM project has already been approved by India's government, has meanwhile illegally occupied reserved forest in the Jamgaon area of Raigadh next to its plant, stirring protests and resolutions from the assemblies of nearby villages. According to a doctor from the Jamgaon Primary Health Center, in the year since the plant went into operation, cases of asthma and other respiratory and gastric diseases have increased 20 times. MSP has also felled trees and started building a factory and road on farmland in Manuapali without proper permission. In March 2005, local villagers blocked a national highway in protest against Monnet's plans to acquire 120 hectares of their land. Villagers have also protested and petitioned against land acquisition by Ind Agro Synergy Ltd., another firm with an already validated CDM project in the works. Many firms are also in breach of the law stating that electrostatic precipitators have to be in operation to curb air pollution.

'There are some local NGOs complaining that the CDM is just there to clean up after the North. But these groups don't go to [United Nations] Conferences of the Parties.'

Ram Babu, PriceWaterhouseCoopers, Mumbai, 2005

But perhaps it's just in Chhattisgarh that the CDM is associated with such operations.

Again, no. In West Bengal, a sponge iron plant run by Jai Balaji Sponge Limited of Kolkata in Ranigunj, Burdwan has a waste heat recovery project set to generate over 400,000 tonnes of carbon dioxide equivalent in credits through the Kyoto Protocol's first commitment period. In 2004, angry residents of nearby Mangalpur village forcibly closed the gates of the factory in a symbolic protest against pollution. They claim that the firm dumps fly ash on open fields, agricultural land, and a children's playground, and that emissions have increased. Old people and children, the worst sufferers, complain of

breathing problems and persistent colds and coughs. Walls and windows of hutments in the village are covered with black spots. According to one villager, paddy production is decreasing each year. Numerous fines have been levied against the plant for pollution since 2001. Union leaders say that pollution has been reduced, but charge management with running the plant's electrostatic precipitator only during the day, to save money.

Some 90 per cent of the factory's workers, mostly illiterate and from neighbouring states, are temporary. Non-unionised workers get only USD 1.50 per day and sometimes have to work 16 hours a day on a no work-no pay basis. No drinking water or toilets are available. Most workers, permanent staff and union leaders interviewed at the factory were unaware of the CDM project and of carbon trading and its financial implications. One local NGO worker had learned about the CDM project only from the *Telegraph*, a newspaper published in Kolkata.

Another CDM project of about the same size, aimed at using waste heat from kilns and blast furnace gases from pig iron production to generate electricity, is run by SRBSL in Durgapur, Burdwan. Most of the 1700 workers are contract labourers, who get only USD 1.30–1.50 for 12 hours' work, without the medical benefits provided for the 30 staff. Releases of dust, smoke and gases from the plant again result in respiratory problems among local residents, especially the very young and very old. Workers' living quarters are covered with a thick layer of coal dust. Water tables and paddy yields have declined, and ponds or ring wells always remain covered with a foul, thick layer of black dust. Local farmers and labourers have also been deprived of what was common land used in part for cultivation. None of the people interviewed – the management representative, the union leader, factory workers or villagers – were aware of carbon trading.

West Bengal polluting firms in other sectors are also cashing in on the opportunity to get carbon money. Jaya Shree Textiles in Prabasnagar, for example, has upgraded boilers and modified motors to reduce energy use, but still pollutes the locality. Its workers remain uninformed about the extra finance supplied by its CDM project.

What about smaller projects – ones that don't generate so many credits? Are there any local objections to them?

Some of the many biomass carbon projects planned for India are also rousing local concerns. One example is the 20-megawatt RK Powergen Private Limited generating plant at Hiriyur in Chitradurga district of Karnataka, which is currently preparing a Project Design Document for application to the CDM. According to M. Tepaswami,

a 65-year-old resident of nearby Babboor village, RK Powergen is responsible for serious deforestation. 'First, the plant cut the trees of our area and now they are destroying the forests of Chikmangalur, Shimoga, Mysore and other places. They pay 550 rupees per tonne of wood, which they source using contractors. The contractors, in turn, source wood from all over the state.' Another villager claimed that 'poor people find it difficult to get wood for cooking and other purposes'. Jobs promised by the firm, Tepaswami complains, were given to outsiders.

Meanwhile, employees at the Karnataka Power Transmission Corporation claim that its 'equipment is adversely affected due to the factory's pollution', while local villagers complain of reduced crop yields and plunging groundwater levels. Project managers deny the allegations. 'If there is deforestation', said plant manager Amit Gupta, 'then local people are to be blamed because they are supplying the wood to us'.[77]

Biomass projects have generally not been designed to benefit the agricultural sector or increase farmer incomes, and money from sale of crop residues or the produce of energy plantations on wastelands do not accrue to landless households. Nor do biogas projects necessarily benefit rural residents. The Bagepalli CDM Biogas Programme proposed for Kolan district of Karnataka state is to set up 5500 two-cubic-metre biogas digesters for households that have an average of two cattle each or more. That excludes the ordinary rural poor, who, on average, own fewer livestock.[78]

'Government figures show that there are about 5 crore (50 million) hectares of "wasteland" in India, land which…now lies open to exploitation through carbon forestry schemes. What the central government does not say is that most of this "wasteland" belongs to Adivasis and other forest-dependent communities, who will be the first to lose out from the development of such schemes.'

Madhya Pradesh activist

What about plantation projects and other forestry 'sink' projects? Are they also running into trouble?

Carbon forestry projects made a late start in the CDM market because they are so controversial. The necessary legal framework, laid out in the Marrakesh accords of 2001, was agreed only in late 2005 at the Montreal climate negotiations. So there is little concrete to point to yet.

But carbon forestry is definitely on the cards for India. The World Bank, forestry and other private sector interests, academics and the government are all busy laying plans and calculating wildly different figures for the carbon credits India could get from trees.[79] In 2003, the Indian pulp and paper lobby issued a blueprint for 'Re-Greening India' as part of its longstanding campaign to be allowed to lease 'degraded' forest land on which to grow industrial plantations. The possibility of the plantations earning carbon credits was discussed in detail.[80] A National Environment Policy Draft circulated by the Ministry of Environment and Forests (MoEF) in 2004 meanwhile confirms a new, 'liberalised' environmental policy that promotes carbon

'Joint Forest Management and Community Forest Management are being used as tools to exclude the Adivasis from their survival sources, and are compelling them to slip into poverty and migrate in search of work. Instead of…recognising Adivasi rights to the forest, the government is seeking their eviction through all possible means.'

Local activist

trading and other environmental services trades. The move towards carbon forestry also chimes with a grandiose existing plan on the part of the MoEF to bring 30 million hectares of 'degraded' forest and other lands under industrial tree and cash crop plantation by 2020, through a new type of collaboration with the private sector, state governments and local communities.[81]

Among the scores of CDM projects being contemplated for India are forestry projects in Madhya Pradesh and Andhra Pradesh states. Here, an organisation called Community Forestry International (CFI) has been surveying opportunities for using trees to soak up carbon. CFI declares that it helps 'policy makers, development agencies, NGOs,

Village in the Handia range.

and professional foresters create the legal instruments, human resource capacities, and negotiation processes and methods to support resident resource managers' in stabilising and regenerating forests.[82] Its work in Madhya Pradesh has been supported by the US Agency for International Development and the US Department of Agriculture's Forest Service, and in Andhra Pradesh, by the Climate Change and Energy Division of Canada's Department of Foreign Affairs and International Trade.

CFI suggests that, in India, the CDM would be a viable income-generating activity for rural indigenous communities. But there are strong reasons to doubt this.

Why?

In India, as everywhere else, it's not abstract theory, but rather the institutional structure into which CDM would fit, that provides the key clues to its likely social and climate outcomes.

Take, for example, a CDM scheme investigated by CFI that would be sited in Harda district, Madhya Pradesh state. Here CFI sees the CDM's role as providing financial support for Joint Forest Management (JFM), an institution that has been the subject of much celebration of late in India[83] and which would be a likely medium for a great deal of Indian carbon forestry.

What is Joint Forest Management?

Joint Forest Management is supposed to provide a system for forest protection and sustainable use through the establishment of village forest protection committees (VFPCs), through which government and development aid funds are channelled. Formalised by state governments and largely funded by the World Bank, JFM was designed partly to ensure that forest-dependent people gain some benefit from protecting forests.[84] It's already implemented in every region of India. Long before carbon trading was ever conceived of, JFM had become an institution used and contested by village elites, NGOs, foresters, state officials, environmentalists and development agencies alike in various attempts to transform commercial and conservation spaces and structures of forest rights for their respective advantages.[85]

So there should be a lot of evidence already for whether it works or not.

Yes, but there's not much agreement about what that evidence means. CFI sees the JFM programme as having improved the standard of living in Adivasi villages, as well as their relationship with the Forest Department. It also found that JFM had helped regenerate forests in Rahetgaon forest range, resulting in higher income for VFPCs, although admitting that in Handia forest range, social conflicts had resulted in decreased JFM-related investment by the Forest Department.[86]

On the other hand, many indigenous (or Adivasi) community members, activists and NGOs see JFM as a system which further entrenches Forest Department control over Adivasi lands and forest management, although the practices of different village committees vary.[87] Mass Tribal Organisations, forest-related NGOs and academics have published evidence that JFM village forest protection committees, composed of community members, function principally as local, village-level branches and extensions of state forest authority.[88]

'If large protected areas or plantations are managed for long-term carbon sequestration and storage, local people may lose access to other products such as fibre or food… [whereas] governments and companies are best placed to benefit from such schemes… [T]he frequently weak organisation (or high transaction costs of improving organisation) of the rural poor and landless will reduce their access to the carbon offset market, particularly given the many complex requirements of carbon offset interventions. Other barriers to the involvement of rural people centre on their prevailing small-scale and complex land use practices, without clear tenure systems.'[94]

Stephen Bass, International Institute for Environment and Development

Who's Encroaching? Forest Peoples and the Law

Milestones in the state's efforts to appropriate land from forest-dependent communities in India include the Indian Forest Act of 1878 and the 1980 Forest Conservation Act, which theoretically provided the central government with ultimate control over most forest land.

In 2002, quoting a Supreme Court ruling, the Ministry of Environment and Forests issued a circular to all state/union territory governments to evict all 'encroachers' from forest land. Between March 2002 and March 2004, it is estimated that 'encroachers' were evicted from 152,000 hectares of forest land, although neither the Supreme Court nor the MoEF had clarified whether the term included people carrying out illegal, commercial logging activities, or Adivasi people, or both. In 2002, an estimated 10 million Adivasi people faced the threat of eviction. The new wave of evictions is helping to create conditions conducive for commercial carbon forestry.

On 23 December 2004, however, the MoEF issued a further circular confessing that due to the lack of definition of 'encroacher', many Adivasi people had been unjustly evicted from their lands. Moreover, following heightened protest by Adivasis and support organisations in late 2004, the central government agreed in early 2005 to introduce the Scheduled Tribes and Forest Dwellers (Recognition of Forests Rights) Bill before Parliament. The Bill would provide Adivasi communities with legal recognition of their forest rights in areas of traditional occupation and use. It would also help regularise lands being cultivated by Adivasis, convert so-called forest villages[91] to revenue villages (with title deeds), and settle disputed land claims.

But Adivasi and support organisations still have to fight to prevent the Bill being diluted before it is passed by Parliament.

Communities interviewed in Harda in 2004 said that VFPC chairmen and committee members have become to a large extent 'the Forest Department's men'.

What's wrong with that?

These local JFM bodies are accused of imposing unjust and unwanted policies on their own communities, of undermining traditional management systems and of marginalising traditional and formal self-governing local village authorities.[89] In one case in Madhya Pradesh, forest authorities and the police shot dead villagers opposing JFM and VFPC policies, in an echo of hostilities between the Forest Department and various classes of other forest users that go back a century (see box above).

According to many Mass Tribal Organisations, communities and activists, JFM was effectively imposed on them without appropriate

consultation and has resulted in the marginalisation, displacement and violation of the customary and traditional rights of the Adivasis in the state.[90] Many state governments implemented JFM programmes on disputed lands. Many Adivasis have lost land and access to essential forest goods.

Current problems with JFM in Madhya Pradesh, according to many local people and activists, include:

- Conflicts within communities as a result of economic disparities between VFPC members and non-members.
- Conflicts between Adivasi groups and other communities generated by the imposition of VFPC boundaries without reference to customary village boundaries.
- Curtailment of *nistar* rights (customary rights to local natural goods).
- Conflicts over bans on grazing in the forest and on collecting timber for individual household use.
- Indiscriminate fining.

According to some Harda activists, JFM has opened deeper rifts within and between Adivasi villages and between different Adivasi groups, and has engendered conflict between communities and the Forest Department. Although funding for the local JFM scheme is now exhausted, VFPCs are still in place in many villages, recouping salaries from the interest remaining in their JFM accounts and from fines imposed on members of their own and neighbouring communities. Communities interviewed also claim that VFPC financial dealings are not transparent. In July 2004, non-VFPC villagers in Harda reported that they would like to see funding of VFPCs stopped and, ultimately, the committees disbanded. They also wanted to see forest management returned to them and their rights to their traditional lands and resources restored.[92] In the words of anthropologist K. Sivaramarkishnan, 'when environmental protection is to be accomplished through the exclusion of certain people from the use of a resource, it will follow existing patterns of power and stratification in society'.[93]

So maybe these embattled village forest protection committees are not the ideal bodies to carry out CDM carbon projects.

That would be an understatement. CFI's proposal that, in order to reduce transaction costs, a federation of VFPCs ought to be created in the Handia range to carry out a pilot carbon offset project is also questionable. So, too, is CFI's suggestion that the Forest Department should adjudicate cases of conflict there, a proposal that many community residents would find unacceptable.

Fieldwork on the involvement of the Chhattisgarh and West Bengal sponge iron industry in carbon trading, as well as on energy, forestry and climate change in India, was carried out in 2006 by Soumitra Ghosh of the NGO Nespon and the National Forum of Forest Peoples and Forest Workers (NFFPFW) (above) in collaboration with Hadida Yasmin and Arindam Das of Nespon, Devjeet Nandi of NFFPFW (see next page) and Nabo Dutta of Nagarik Mancha.

Fieldwork on the likely consequences of carbon forestry in India was undertaken by Emily Caruso (right) of the Forest Peoples Programme in collaboration with Vijaya Bhaskara Reddy (left), Yakshi Shramik, Adivasi Sangathan and local activists in July 2004.


Hadida Yasmin


Arindam Das


Devjeet Nandi

But it seems there could be an even more fundamental problem. If JFM projects are going forward anyway, even without the CDM, they're not saving carbon over and above what would have been saved anyway. So how could they generate credits?

That's not clear. And there are plenty of other problems with CFI's carbon sequestration claims as well. For example, CFI doesn't take into account the changes in numbers of people and in community and family composition to be expected over the project's 20–25 year lifetime. CFI's estimates of fuelwood used by communities in the Rahetgaon range are also inaccurate. CFI believes every family uses two head loads of fuelwood per week, but recent interviewees suggested that a more realistic figure would be 18–22, especially during the winter and the monsoon season. CFI also makes the questionable assumption that local communities would relinquish their forest-harvesting activities for the sake of very little monetary income from carbon sales, and that income flowing to VFPCs would be transparently distributed.

In order to assess how much carbon would be saved, CFI compared vegetation in forest plots at different stages of growth and subject to different kinds of pressure from humans. Yet while the total area of forest to be considered is 142,535 hectares, the total number of 50 square metre plots assessed was 39, representing a total study area of only 9.75 hectares. That may be an adequate sample in biological terms. But it's hardly enough to assess the range of social influences on carbon storage in different places.

Have any prospective carbon forestry projects been looked at in other parts of India?

Many. To take just one more nearby example, in Adilabad, Andhra Pradesh state, CFI saw possibilities of sequestering carbon by reforesting and afforesting non-forest or 'degraded' forest lands whose carbon content has been depleted by a large and growing human and cattle population, uncontrolled grazing of cattle in forests and 'encroachment' on and conversion of forest lands for swidden cultivation.

The best option, CFI felt, would be to regenerate teak and mixed deciduous forests. Clonal eucalyptus plantations would, it thought, accumulate carbon faster, and would have other commercial uses such as timber and pulp, as well as incremental returns for any interested investor, but would cost more to establish and maintain, and would be sure to be condemned by Adivasi communities and activists as a new form of colonialism.[95]

So who would carry out these regeneration projects?

Here CFI came to a different conclusion than in Madhya Pradesh. In Andhra Pradesh, it decided, the best agencies for taking on forest regeneration would be women's self-help groups (SHGs).

Which are what?

SHGs were set up by the state-level Inter-Tribal Development Agency during the 1990s as a mechanism for improving the finances of households through micro-credit schemes and capacity-building, as well as linking households with financial institutions and government authorities. CFI says that they're much more dynamic, accountable and transparent than other local institutions, such as forest protection committees, which are viewed as inefficient, untransparent, untrustworthy, and troubled in their relationship with the Forest Department.

Sounds perfect.

Except that it's hard to see how the virtues of the women's self-help groups could work for the carbon economy. For one thing, CFI states that only if the SHGs come together in a federation would carbon offset forestry projects be financially viable, given the high transaction costs involved in preparing and carrying them out. Yet it does not explain how such a federation could come about in rural communities, nor how SHGs could become involved in CDM projects and link themselves to the carbon market. Nor does it mention that SHGs currently work in relative isolation from the Panchayat Raj institutions (the ultimate village-level formal self-governing authority in rural India), the Forest Department and local forest protection committees.

But surely there's nothing to worry about yet. Maybe we can just learn as we go along.

The problem is that the mere fact that studies like CFI's are being carried out already gives legitimacy to the idea of carbon offsets in the South. Few outsiders will notice that the conclusions are suspect.

Still, you've only been talking about problems with JFM, not with carbon offset trading as such.

Whether or not JFM is involved, many Indian activists fear that by creating a market for carbon, CDM projects will engender change in the relationship between Adivasis and their lands and forests. In order to avoid conflict, any CDM project proponent will need to clarify who owns the land, the project and the carbon.[96] This immediately militates

The 'Voluntary Market' Comes to India: A Case Study

When the rock group Coldplay released its hit album *A Rush of Blood to the Head*, the band said that part of the climate damage caused by its production would be offset by the planting of 10,000 mango trees in southern India.

More than four years after the album's release, however, many of Coldplay's good intentions have withered in the dry soil of Karnataka state, where the saplings it sponsored were planted. The middleman in Coldplay's initiative was the UK's Carbon Neutral Company, which had claimed that the scheme would soak up carbon dioxide emissions and help improve the livelihoods of local farmers.

The Carbon Neutral Company contracted the task of planting the trees to a group called Women for Sustainable Development (WSD), who got GBP 33,000 for the deal. WSD is headed by Anandi Sharan Meili, born in Switzerland of Indian origin and a Cambridge graduate. She now claims that the scheme was doomed from the outset.

In the villages of Varlakonda, Lakshmisagara and Muddireddihalli, among the dozen that Mieli said had received mango saplings, no one had heard of Coldplay. Most of those who received saplings said they had not been given the nedessary funding for labour, insecticide or spraying equipment.

One Lakshmisagara villager, Jayamma, managed to get 50 of her 150 trees to survive only because she had a well on her land. 'I was promised 2,000 rupees every year to take care of the plants and a bag of fertiliser. But I got only the saplings,' she said. Some other villagers were also offered saplings but didn't have enough water to nourish them.

In nearby Varlakonda, about 10 families were given approximately 1,400 saplings. Of these, just 600 survived. Another farmer who took 100 saplings, said: '[Meili] promised us that she'd arrange the water.' But villagers said a tanker came only twice.

One of the few successes is the stretch of 300 mango trees owned by Narayanamma, 69, and her husband Venkatarayappa, 74. They were apparently the only couple to receive 4,000 rupees from Meili. At the same time, they spent 30,000 rupees on tankers and labourers. 'We were promised money for maintenance every year but got nothing', said Narayanamma.

Sitting in her spacious house in Bangalore, Meili said that she had distributed 8,000 saplings, but acknowledged that 40 per cent had died. The project had foundered, she said, because of inadequate funding. She accused Future Forests of having a 'condescending' attitude. 'They do it for their interests, not really for reducing emissions. They do it because it's good money,' she said.

The Carbon Neutral Company said that WSD had a contractual responsibility to provide irrigation and support to farmers. Richard Tipper, the director of the Edinburgh Centre for Carbon Management, which monitored the project for Carbon Neutral, said that the Karnataka project had 'experienced major problems' because WSD had not raised the necessary money to administer the project and because of a long drought.

If the Karnataka project does not offset the carbon emissions that Coldplay specified, the Carbon Neutral Company claims, it will make good the amount from other projects. Coldplay is supporting a similar project, which Carbon Neutral says is more successful, in Chiapas, Mexico.

A source close to Coldplay said that the band had 'signed up to the scheme in good faith' with the Carbon Neutral Company and that 'it's in their hands. For a band on the road all the time, it would be difficult to monitor a forest.'

Source: Amrit Dhillon and Toby Harnden, 'How Coldplay's Green Hopes Died in the Arid Soil of India', *Sunday Telegraph* (London), 30 April 2006.

against Adivasi peoples, since in India, the government claims formal ownership and control over indigenous lands and resources. Access and ownership rights are likely to be transformed into benefit-sharing and stakeholder-type relationships. Adivasi communities may lose their capacity to sustain food security, livelihoods, and fundamental social, cultural and spiritual ties. Lands Adivasis depend on could be classified as 'wasteland' and turned over to carbon production. In short, it is unclear how CDM projects could do anything but further entrench discrimination against Adivasi communities by government authorities and rural elites.

CDM afforestation projects can be established on lands that have not been forested for 50 years, and reforestation projects on lands that were not forested on 31 December 1989.[97] But forest conservation projects are also on the horizon. Although conservation schemes are not yet eligible for CDM, conservation financiers and the World Bank and Global Environment Fund are increasingly promoting the idea of protected areas as an additional source of carbon credits.[98] Indigenous peoples will clearly be in for a fight should carbon sequestration and protected area projects come together on their territories.

Overall, what's the future for CDM in India?

The country is still seen as a 'front runner' for CDM projects. The government is determined to press forward, and a lot of carbon salesmanship can be expected in the years ahead.[99] But foreign investors are worried that many projects may not get the green light from the CDM Executive Board due to being indistinguishable from business as usual. 'The sustainability just isn't there,' said one consultant employed by a European company to source carbon credits.

No Need to Know? The Secret Economy of Carbon

In 2004, the women's self-help group of Powerguda village of Andhra Pradesh, India, was given cash in exchange for planting *Pongamia* trees. The tree's seeds can be used to make a petrol substitute.

The women were given a certificate and USD 645 for 'offsetting' the emissions produced by a World Bank workshop on climate change held in Washington, DC.[100] The Bank claims that 30 years of biofuel use by government authorities in Andhra Pradesh will compensate climatically for the workshop's emissions.

The women didn't know why they had received the money. They were also unaware of the benefits that went to the carbon traders, releasers and agencies involved.

The irony is that northern Andhra Pradesh has recently been hit by one of the most devastating droughts ever, very possibly as a result of global warming. In the summer of 2004, the number of suicides in the province among farmers driven to desperation by their crippling debts reached 3,000.

The lack of discussion with affected parties that was evident in Andhra Pradesh appears to be a common denominator of carbon-saving projects nearly everywhere:

- The Project Design Documents of four different Indian biomass power projects each repeated, word for word, alleged favourable comments made by a village head. All of the projects – Rithwick, Perpetual, Indur and Sri Balaji – are located in Andhra Pradesh state, but all have different characteristics and are spread over hundreds of kilometres. Even spelling mistakes were repeated in the documents, suggesting that consultation was not genuine. The private consultants who prepared the documents, PriceWaterhouseCoopers and Ernst and Young, responded lamely that identical projects in similar geographical locations were likely to have similar Project Design Documents.[101]
- A senior legal officer at the West Bengal Pollution Control Board, Biswajit Mukherjee, was surprised to learn about CDM support for sponge iron industries in his state. How, Mukherjee wondered, can companies with long records of pollution, including some still paying penalties to the West Bengal government, start 'clean development' projects?[102]
- In Uganda, community members living close to the UWA-FACE carbon plantation project near Mount Elgon said that they knew nothing about the project's carbon credits. Members of the Bubita sub-county local council and top district officials were also in the dark. Residents wanted to know about the financial benefits FACE Foundation receives, particularly because the project encumbers their land for a long time, and planned to take the matter up with their local parliamentarian.
- The Ugandan acting deputy commissioner for forestry in the Ministry of Water, Lands and Environment, Ignatius Oluka-Akileng, told an interviewer in 2001 that his forestry directorate knew little about carbon trades involving state forest lands, nor how much foreign companies were to gain from them, and begged the interviewer to help find information.

Sri Lanka – A 'clean energy' project that was not so clean

Today's smart business money is going into buying carbon credits from projects that destroy industrial gases or methane (see the preceding 'India – A taste of the future'). These are the cheapest credits and they can be obtained with the least trouble. Yet they do nothing to address the flow of fossil fuels out of the ground.

But carbon projects that promote energy efficiency or renewable energy technologies do exist. The Kyoto Protocol's Clean Development Mechanism has dozens of such schemes in its pipeline, although they generate only a miniscule proportion of total credits. Some of these projects are even small and community-based.

So far, however, such projects are merely a bit of expensive window-dressing for the big industrial projects generating cheaper credits. In a competitive market, they appear to have little future.

But are all such projects desirable even on their own terms? For example, are all renewable energy projects good just because they can be described as 'renewable'?

I don't understand. What could possibly be wrong with promoting renewable energy?

It depends on how it's used. Let's take, for example, one of the world's very first attempts to 'compensate for' or 'offset' industrial carbon-dioxide emissions – a rural solar electrification programme in Sri Lanka.

The story begins in 1997, when the legislature of the US state of Oregon created a task force that later legally required all new power plants in the state to offset all of their carbon dioxide emissions. When companies put in bids for the contract to build a new 500-megawatt, natural-gas fired power station in Klamath Falls, they also had to present plans for 'compensating' for its CO_2 emissions. The winner of the contract, PacificCorp Power Marketing, proposed a diversified USD 4.3 million dollar carbon-offset portfolio, allocating USD 3.1 million to finance off-site carbon mitigation projects. In particular,

the firm put USD 500,000 into a revolving fund to buy photovoltaic (solar-home) systems and install them in 'remote households without electricity in India, China and Sri Lanka'.[103] In 1999, PacificCorp Power and the City of Klamath Falls signed the necessary finance agreement with a US solar-energy company called the Solar Electric Light Company, or SELCO.[104]

In all, SELCO agreed to install 182,000 solar-home systems in these three Asian countries, 120,000 in Sri Lanka alone.[105] The idea was that the solar systems would reduce the carbon dioxide emissions given off by the kerosene lamps commonly used in households that are 'off-grid', or without grid-connected electricity. On average, SELCO calculated, each such household generates 0.3 tons of carbon dioxide per year.[106] SELCO argued that the installation of a 20- or 35-watt solar-home system would displace three smoky kerosene lamps and a 50-watt system would displace four. Over the next 30 years, it claimed, these systems would prevent the release of 1.34 million tons of carbon into the atmosphere, entitling the Klamath Falls power plant to emit the same amount.

So what's the problem? It sounds like a win-win situation. The Klamath Falls plant makes itself 'carbon-neutral', while deprived Asian households get a new, clean, green, small-scale source of energy for lighting!

Not quite. Aside from the fact that such projects can't, in fact, verify that they make fossil fuel burning 'carbon-neutral' (see Chapter 3), the benefits to the South that carbon offsetting promises don't necessarily materialise, either.

Why not?

Start with the structure of the trade. Just as industries in the North have historically relied on the environmental subsidy that cheap mineral extraction in the South has provided, in the PacificCorp/SELCO project a Northern industry used decentralised solar technology to reorganise off-grid spaces in the South into spaces of economic opportunity that subsidised their costs of production through carbon dioxide offsetting.[107] Once again, the South was subsidising production in the North – this time not through a process of extraction, but through a process of sequestration.

You'll have to explain that to me.

Traditionally, fossil fuel extraction has resulted in the overuse of a good that can't be seen – the global carbon sink. And the inequality in the use of that sink between North and South has been invisible. Now, however, that inequality is becoming more visible within cer-

tain landscapes in the form of physical and social changes like those associated with the PacificCorp/SELCO project.

The solar component of the Klamath Falls plant, in essence, proposed to 'mine' carbon credits from off-grid areas in Sri Lanka. However, the existence of these off-grid areas is partially due to social inequalities within Sri Lanka. In this case, the project was taking advantage of one particularly marginalised community of Sri Lankan workers in order to support its own disproportionate use of fossil fuels.

Well, maybe. But so what? PacificCorp didn't create the inequalities in resource use that it was going to benefit from. Why should it be up to PacificCorp to solve social problems in Sri Lanka? Besides, aren't we in danger of making the best the enemy of the good here? PacificCorp may have bought the right to go on using a lot of fossil fuels, but at least the Sri Lankan workers got a little something out of the deal to improve their lives, too.

Well, as a matter of fact, that really wasn't the case, either. In practice, the PacificCorp/SELCO arrangement in Sri Lanka wound up supporting what one Sri Lankan scholar-activist, Paul Casperz, calls a feudal system of 'semi-slavery' on plantations.

Semi-slavery? Come on! Aren't you being a bit inflammatory? How could decentralised, sustainable solar power possibly have anything to do with that?

Solar power didn't create the problem, of course. But pollution markets' interventions like this one in the tea estate sector have a way of perpetuating inequality, just as in Los Angeles (see Chapter 3). The trick, as so often in the world of development and environment, is to understand that a bit of technology is never 'just' a neutral lump of metal or a piece of machinery benignly guided into place by the intentions of its providers, but winds up becoming different things in different places.

In Sri Lanka, the kerosene-lamp users that PacificCorp/SELCO ended up targeting earned their living in what is known as the 'estate' or tea plantation sector. This is a sector in which nearly 90 per cent of the people are without grid-connected electricity, compared to 60 per cent of the non-estate rural sector and only 5 per cent of urban dwellers.

A large proportion of this off-grid population was – and is – from the minority estate Tamil community,[108] which lives and works in conditions of debt dependence on tea and rubber plantations established by the British during the colonial period. Unfair labour practices in the sector have continued to keep estate society separate from and unequal to the rest of Sri Lankan society. Daily wages average USD

1.58 and the literacy rate is approximately 66 per cent, compared to 92 per cent for the country as a whole.[109] The estate population is also underserved when it comes to infrastructure. A sample survey of 50 estates found that 62 per cent of estate residents lacked individual latrines and 46 per cent did not have a water source within 100 metres of their residence.[110]

Due partly to its cost, electrification, unlike health care, water supply, and sanitation, has never been one of the core social issues that social-service organisations working among the estate population get involved in.

That would seem to make the estate sector the perfect choice for a solar technology project. I still don't see the problem.

There's no question that electrification could do a lot of good for workers and their families. By displacing smoky kerosene lamps, it would provide a smoke-free environment that reduces respiratory ailments, as well as quality lighting that reduces eyestrain and creates a better study environment for the school-going generation[111] who are eager to secure employment outside the plantation economy. Researchers have found clear connections between off-grid technology and educational achievement.

But as tea estates are regulated and highly structured enclave economies, SELCO could not approach workers without the cooperation and approval of estate management. The chief executive of one plantation corporation, Neeyamakola Plantations, was willing to allow SELCO access to the 'market' that his off-grid workers represented. He himself liked the idea of solar electrification, but for an entirely different set of reasons.

How's that?

Sri Lanka's 474 plantation estates were privatised recently. Facing fierce competition from other tea-producing countries, they need to lower production costs and increase worker productivity in order to compensate for low tea prices on the global market and wage increases mandated by the Sri Lankan government. Neeyamakola had already introduced some productivity-related incentives and thought that solar-home systems could provide another. Furthermore, with a regular electricity supply, workers could watch more television.[112] Seeing how other people in the country lived, they'd want to raise their standards of living too. For that, they'd need money. To earn more money, they'd work harder or longer, or both.[113]

So, in 2000, Neeyamakola was only too happy to sign an agreement

with SELCO for a pilot project on its Vijaya rubber and tea estate in Sri Lanka's Sabaragamuwa province, where over 200 families lived.

It sounds to me like the perfect match. If Neeyamakola focused on the bottom line, what's so bad about that? It's a matter of unleashing the profit motive for the incremental improvement of society and the environment.

No one expected Neeyamakola, SELCO or PacificCorp to operate as charities. The point is to understand whether such a business partnership was ever capable of doing the things it intended to do, what effects the partnership had on the societies involved, and who might be held responsible for the results.

So what happened?

At first, the pilot project was to be limited to workers living in one of the four administrative divisions into which the Vijaya estate was divided, Lower Division, and in nearby villages. Some four-fifths of these workers were estate Tamils living in estate-provided 'line housing'. The other fifth were Sinhalese who lived within walking distance.

In the first three months, only 29 families decided to participate in the solar electrification project: 22 of Lower Division's 63 families and seven Sinhala workers who lived in adjacent villages. In the end, the project installed only 35 systems before it was cancelled in 2001.

What went wrong?

Two things. The first thing that happened was that, in the historical and corporate context of the estate sector, the SELCO project wound up strengthening the already oppressive hold of the plantation company over its workers.

But how could that happen? Solar energy is supposed to make people more independent, not less so.

This gets back to the nature of Neeyamakola as a private firm. From the perspective of plantation management, the electrification project had nothing to do with carbon mitigation and everything to do with profitability and labour regulation.

Neeyamakola's concern was to increase productivity. Its idea was to use access to loans for solar-home systems to entice estate labourers into working additional days. The Neeyamakola accounting department would deduct a 500-rupee loan repayment every month and

send it to SELCO.[114]

In order to qualify for a loan, workers had to be registered employees who worked at least five days a month on the estate.[115] The loan added another layer of worker indebtedness to management. In this case, the indebtedness would last the five years that it would take the worker to repay the loan taken from the corporation.[116]

From workers' point of view, the system only added to the company's control over their lives. Historically, the only way that estate workers have been able to get financing to improve their living conditions has been through loans that keep them tied to the unfair labour practices and dismal living conditions of estate life. To upgrade their housing, for instance, workers have to take out loans from the Plantation Housing and Social Welfare Trust. One condition of these loans is that 'at least one family member of each family will be required to work on the plantation during the 15-year lease period',[117] during which estate management takes monthly deductions from wages. Hampered by low pay and perpetual indebtedness, workers find it difficult to move on and out of the estate economy.

I see. And what's the second problem?

Inequality and social conflict of many different kinds. First, as Neeyamakola offered solar-home systems primarily to estate workers, most of whom are members of the Tamil ethnic minority, the nearby off-grid villagers of the Sinhalese majority felt discriminated against and marginalised. Disgruntled youth from adjacent villages as well as from estate families who weren't buying solar systems threw rocks at the solar panels and otherwise tried to vandalise them.

Second, local politicians and union leaders saw solar electricity as a threat to their power, since both groups use the promise of getting the local area connected to the conventional electricity grid as a way of securing votes. So they started issuing threats to discourage prospective buyers.

Third, the village communities living around the Vijaya estate feared that if too many people on the estate purchased solar systems, the Ceylon Electricity Board would have a reason for not extending the grid into their area. And without the grid, they felt, small-scale industry and other entrepreneurial activities, which would generate economic development and increase family income, would remain out of reach, making their social and economic disadvantages permanent.[118] (Any delay in the extension of the grid to the area occasioned by the PacificCorp/SELCO Neeyamakola project, of course, would have its own effects on the use of carbon, and would have to

be factored into PacificCorp/SELCO's carbon accounts. There is no indication that this was done.)

Added to all of this was inequality within the community of estate workers themselves. One consequence of Neeyamakola's focus on getting more out of its workers was that many estate residents whose work is productive for society in a wider sense were ineligible for the systems.

One example is the primary school teacher in the Tamil-medium government school that served the estate population. The daughter of retired estate workers, the teacher received a reliable monthly salary, could have met a monthly payment schedule, and was willing to pay, but was ineligible for a system because her labour was not seen as contributing directly to the estate's economic productivity and profit margin. Retired estate workers and their families were excluded for the same reason. SELCO, a firm new to Sri Lanka, was unable to ensure community-wide benefits or distributive equity within the community as a prerequisite in the design of the pilot project.

On the Vijaya estate, in short, the decentralised nature of solar power – in other contexts a selling point for the technology – had quite another impact and meaning in the context of Sri Lanka's estate sector. It provided the company that was controlling the 'technology transfer' with a new technique to exert control over its labour force and ensure competitive advantage, while exacerbating underlying conflicts over equity.

It's interesting to note, incidentally, that solar projects in Sri Lanka often fall short even at the household level, where many families end up reducing their consumption of kerosene by only 50 per cent.[119] There are many reasons for this. Kerosene use is necessary to make up for faulty management while household members become acquainted with the energy-storage patterns of the battery and system operation. Households also face problems managing stored energy, with children often using it all up watching afternoon television. And local weather patterns and topography likewise take their toll. In some hilly areas with multiple monsoons, solar can supplement kerosene systems at best for a six- to nine-month period, depending on the timing and duration of the monsoon.

Did PacificCorp's electricity customers – or the Oregon legislature – know about all this?

Given the geographical and cultural distances involved, it would have been difficult for them to find out. On the other hand, it seems unlikely that Northern consumers of electricity – if they are informed of

This section is based on the research of Dr Cynthia Caron. After completing her Ph. D. at Cornell University in the US on electricity sector restructuring in Sri Lanka, Dr Caron moved to Sri Lanka. She has been awarded a grant from the MacArthur Foundation and has been researching forced migration, resettlement and Muslim nationalism and its relation with Sri Lanka's ethnic conflict, as well as working on development and health projects.

such details – will accept carbon-offset projects that involve not only dubious carbon accounting, but also blatantly exploitative conditions and the reversal of poverty alleviation efforts.

This is another reason for doubting how long-lived undertakings like PacificCorp/SELCO's will be. From the beginning, they have been more about 'preserving the economic status quo' and promoting cost efficiency in Northern countries than about supporting equity in the South.[120]

OK, I can see there were some problems. But surely social and environmental impact assessments could have identified some of these problems in advance. With proper regulation, they could then have been prevented.

This is a key issue. For example, the solar technology could have been reconfigured so that an entire line of families could have pooled resources and benefited, rather than just individual houses.

But setting up an apparatus to assess, modify, monitor and oversee such a project isn't by itself the answer. Such an apparatus, after all, would have brought with it a fresh set of questions. Who would have carried out the social impact assessment and would they have been sensitive to local social realities? Would its recommendations have been acceptable to Neeyamakola? Would its cost have been acceptable to PacificCorp? What kind of further oversight would have been necessary to prevent an assessment from merely adding legitimacy to a project whose underlying problems were left untouched?

Just as a technology is never 'just' a neutral piece of machinery which can be smoothly slotted into place to solve the same problem in any social circumstance, so the success of a social or environmental impact assessment is dependent on how it will be used and carried out in a local context.

But if success is so dependent on political context, how will it ever be possible for new renewable technologies to make headway anywhere? If it isn't possible, then we might as well give in and keep using fossil fuel technologies! We might as well go along with ExxonMobil when they claim that we have to go on drilling oil since anything else would be to betray the poor!

The alternative is not to accept the dominance of fossil fuel technologies. Their continued dominance also does nothing to improve the position of disadvantaged groups such as Sri Lanka's estate Tamils. Nor is the alternative simply to accept the system of global and local inequality exemplified in Sri Lanka's estate plantation sector.

The alternative, rather, is to act using our understanding that what keeps marginal communities such as that of Sri Lanka's estate Tamils

in the dark, so to speak, is not only a matter of 'suboptimal' use of technology, but also a deeper pattern of local and global politics. Cutting fossil fuel use means understanding this deeper pattern.

Up to now, climate activists and policy makers have often told each other that 'the essential question is not so much what will happen on the ground, but what will happen in the atmosphere'.[121] The example of the PacificCorp/SELCO/Neeyamakola rural solar electrification project helps show why this is a false dichotomy. What happens on the ground in communities affected by carbon projects is important not only because of the displacement of the social burdens of climate change mitigation from the North onto already marginalised groups in the South. It is also important because what happens on the ground influences what happens in the atmosphere.

Thailand – Biomass in the service of the coal and gas economy

The experience of Sri Lanka shows that not all projects that go under the name of 'renewable energy schemes' promote local betterment, foster local autonomy, or help in the transition away from fossil fuels.

Other types of 'renewable energy' projects may turn out to be of equally questionable climatic or social value when integrated into the carbon market as supports for a system dominated by fossil fuel technologies and corporate expansion. A good example is a 'biomass energy' project seeking CDM support in Yala province in Thailand's troubled far south.

There, an approximately 23-megawatt power plant fuelled by rubberwood waste and sawdust is being developed by a diverse group of companies linked by their interest in the carbon trade. They include:

- Gulf Electric, an independent power producer 50 per cent owned

by Thailand's Electricity Generating Public Company (EGCO) and 49 per cent by Japan's Electric Power Development Company (EPDC).

- Asia Plywood (AP), a Yala rubberwood processor, next to one of whose factories the plant would be located.
- Det Norske Veritas (DNV), a Norwegian 'risk management' consultancy which has managed to parlay its experience in certifying the credibility of pioneer carbon schemes such as Yala into a major share in CDM's consultancy market.

EPDC is a largely fossil-fuel-oriented company and the largest single user of coal in Japan.[122] It operates 66 coal-fired and hydropower stations and burned USD 652 million in fossil fuels in 2001 alone.[123] It also has an interest in six gas-fired power generating plants in operation or under construction in Thailand, totalling 2,733 megawatts.[124] Nor, with a large new coal-fired power station under construction in Yokohama, does EPDC contemplate any change of direction in the future. 'Coal offers stable supply and outstanding economical efficiency,' says a company presentation, 'hence we predict it will support world energy consumption throughout this century. Our great mission is to ensure that coal is burned cleanly, thus reducing the burden on the environment.'[125]

Accordingly, EPDC's main response to global warming is coal gasification, which of course does nothing to halt the flow of fossil carbon to the surface, and the development of a nuclear power plant. For EPDC, the point of investment in Yala would be to gain carbon credits to help it, and Japan generally, maintain current levels of fossil-fuel combustion in the face of Kyoto pressures.

EGCO is also largely structured around fossil-fuel technologies. One of EGCO's gas-fired power stations, in fact, is operated in partnership with UNOCAL, a US multinational fossil-fuel firm that is anti-Kyoto Protocol and sceptical about climate change.

Gulf Electric, meanwhile, with a mainly gas-fuelled generating capacity, has become well known in recent years partly due to the overwhelming defeat in March 2003 of its proposal to build a 734-megawatt Bo Nok coal-fired power plant on the Gulf of Thailand. Local people in Prachuab Khiri Khan province concerned about pollution and other potentially destructive effects of the project had mounted a successful regional and national campaign against it. Following their victory against Gulf, the company moved quickly to propose a gas-fired substitute plant further up the coast.

If any further evidence were required that the sponsoring firms are

Leaders of the movement that defeated the proposal for a coal-fired power plant at Bo Nok on the Gulf of Thailand meet the press in 2004. The proposed power plant was a project of Gulf Electric, a firm that hopes to gain carbon finance for a joint venture biomass plant using rubberwood waste. Jinthana Kaewkhaaw (right), a local villager with a fourth-grade education, was awarded an honorary Ph. D. from Thailand's alternative Midnight University for her tireless efforts against the Bo Nok plant. Galok Wat-Aksorn (left) is the widow of another local leader, Charoen Wat-Aksorn (pictured on her T-shirt), who was murdered over a land dispute connected with the struggle. The leaders were voicing their support for another movement further south battling against the establishment of a gas pipeline and gas cracking plant that encroaches on Muslim *wakaf* common land and degrades the local environment. The alliance of the two movements, one composed of mainly Buddhist villagers, the other composed of mainly Muslims, defies government attempts to pit Thailand's majority Buddhist community against Muslims in the south of the country.

not treating the Yala project as a step away from fossil fuels, there is the fact that they had originally planned to build the power plant without any carbon finance at all. It is only since the depths of the Thai financial crisis, in 1998, that they have contemplated securing supplementary funding through carbon trading.[126] Encouraging them to develop the idea have been subsidies from Thailand's Energy Policy and Planning Office's Energy Conservation Promotion Fund[127] as well as portions of both a USD 30 million OECF loan under a 1999 five-year Global Environmental Facility (GEF) project and a GEF outlay of USD 3 million toward commercial risk premiums.[128]

But if the point of the Yala project is to help keep corporations using fossil fuels, how can the credits it generates possibly be tokens of measurable climate benefits?

The project's proponents claim that it would save a measurable amount of carbon by 'replacing' some of the electricity in the Thai grid that's now generated by burning fossil fuels.

How do they know that the plant would do that?

The validator, DNV, realised it had no way of determining that the new project's power would be replacing either combined-cycle natural gas or oil-fuel electricity in the national grid.[129] It was also told by Thailand's electricity authority that it was 'often a mistake to see a direct link of displacement between an increase in one component of the grid and a reduction in another'. So DNV looked at the 'average' carbon intensity of electricity from the Thai grid. It then subtracted the figure corresponding to the projected carbon intensity of electricity from the project and multiplied that by the project's output. DNV argued that the resulting figure is conservative, since expansion plans by the Thai electricity authority featured a 'higher carbon intensity

than the grid average used by the project'. This is in spite of the fact that the authority's figures were a subject of hot dispute in Thailand and carbon intensity per year varies by about 20 per cent.[130]

It all sounds a bit too much like guesswork, given that the object is the calculation of a precise number of tonnes of CO_2 saved. How can they possibly be sure that if the project didn't exist, exactly that amount of electricity would have been generated through nothing better than the current 'average' fuel mix?

They can't. But it's a procedure that's acceptable in principle to the UN.

I assume the consultancy also factors in how much additional use of fossil-generated EPDC electricity the project might encourage in Japan?

No.

Why not? If the project helps reassure electricity consumers or investors in Japan that it's OK to keep using coal-generated electricity there, doesn't that add to the carbon debit of the project?

Yes, it does. But Kyoto carbon accounting tends to ignore such realities, not that they could be measured anyway (see Chapter 3). So DNV was under little obligation to present an answer to the question in any of the hundreds of pages of highly technical documents on the Yala project. Assessing the many indirect carbon or climatic effects of the project, according to DNV, 'is not necessary in our opinion'.[131]

Let me ask another question, then. If the project was going to be built anyway, then what exactly does it 'save' that deserves a climate subsidy? It's just business as usual.

That's right, and the CDM rulebook demands that CDM projects prove that they are not business as usual. As a result, the Yala project's proponents have had to produce some evidence that it isn't business as usual.

How have they done that?

With difficulty. At first, project proponents claimed that, without carbon credit sales, the project's return on equity would be lower than 'desirable' or 'normal' but that the good publicity associated with a climate-friendly project would make up for this. When NGOs pressed DNV to provide evidence for these claims, DNV said that it did not have permission to make public the 'confidential' financial analysis the project proponents had given it. Project proponents also asserted that the planning needed for the project was a 'barrier' that required carbon finance to overcome, and that the project was tech-

nologically novel in the Thai context.[132] Later on, the project developer also noted that the project was sufficiently financially shaky that it had to be put on hold in 2002.

But even if that's true, that wouldn't prove that the project could be undertaken only with carbon finance.

No. And there's a lot of evidence that, in fact, the prospective carbon income of the project has no weight at all with the investors. For example, uncertainty about whether the project would ultimately be allowed to be registered with the CDM, or about whether the Thai government would overcome its initially sceptical stance towards CDM projects, does not seem to have had any effect on the project's original construction schedule. What's more, Sarath Ratanavadi, managing director of Gulf Electric, was quoted in the *Bangkok Post* on 13 June 2003 as saying that Gulf Electric and EPDC 'will go ahead with the 800 million baht project [Yala biomass] even without CDM'.

What was DNV's response to that?

It protested that the project's business-as-usual status 'is not as obvious as asserted'[133] and said it had consulted with EPDC about Sarath's statement.

From a scientific point of view, that's not terrifically convincing.

No. For this project to be registered with the CDM would, in fact, probably be a net loss for climatic stability, since it would enable the Japanese government to write down its Kyoto commitment by half a million tonnes of carbon dioxide without providing anything verifiable in return. Nevertheless, the controversy over Yala is representative of the level of debate that still prevails in front of the UN committees and panels responsible for overseeing the CDM.

Well, if the project's benefits for the climate can't be verified or quantified, perhaps we should forget about looking at it as a carbon project and just view it as a standard development project with an unusual prospective source of funding. Does it at least provide some benefits for local people?

Many local residents in fact quietly oppose the new development on Asia Plywood's Yala site as being likely to reinforce local imbalances of power over air and water quality. They've long felt animosity toward AP for causing pulmonary health and other problems through smoke and ash pollution of local air, water and land, and profess 'no trust' in the firm. Subdistrict officials even allege that the firm has not paid its full share of taxes.

Biomass is not always benign. *Noo Nui*, a comic figure from the shadow puppet folklore of Southern Thailand, registers his opposition to a proposed power plant using waste biomass on the grounds that it will 'destroy the environment'. The project in question didn't try to gain access to carbon finance, but is similar to one in the same region that did.

But why should any of that make any difference to their view of the new project?

Because for them, the important thing about the project is not the theory behind it, but who is going to carry it out. Local people might well agree with DNV that the disposal of rubber wood residues at Asia Plywood and other installations is 'one of the most serious environmental problems in the Yala community'. But they view corporate reliability as a more important prerequisite for solving such problems than technical proposals. Refusing to abstract from the local political context, they see narrowly technical factors such as new equipment or CDM certification as irrelevant as long as underlying conflicts between company and community are not tackled. 'If current problems are not solved', one local health official interviewed asked, 'how are new problems going to be addressed?'

Shouldn't DNV have taken account of such views?

DNV was well aware of local people's view that AP should solve its existing problems with 'noise, wastewater and solid waste' before attempting anything else, and should communicate the details of construction to the community as well as involve it in monitoring. Yet it had few incentives to take villagers' political and social analysis seriously.

DNV did write about a 'comprehensive public participation programme' to 'accurately inform local residents, government officials and other concerned members of the public about the Project and expected impacts' and 'obtain feedback, mainly from the local communities and concerned government agencies, with regard to their opinions and concerns about the Project'. Those to be consulted included

the subdistrict administrative authority's committee and residents in 'surrounding villages'. Yet there is little evidence that this 'comprehensive' programme was satisfactory to local residents. According to DNV itself, the meeting it claimed to hold with the Lam Mai subdistrict authority took less than one hour.

Throughout, DNV presented the project and its participant firms as a 'black box' or neutral machine into which formulas for environmental improvement, participation and good community relations could be fed with near-automatic results. Local environmental problems were seen as stemming from a mere technical gap – one that the CDM project would help fill.

Similarly, when at an August 1999 public consultation few respondents agreed with the project, DNV put it down to 'previous dissatisfaction with the dust caused by AP's operation' and claimed that, following the installation of a new boiler which uses sawdust, 'Lam Mai [subdistrict] residents no longer disagree with the Project'.[134]

Are you saying that that's not true?

It's certainly not the impression given by a number of local residents interviewed more recently. To them, the workings of the firms involved in the project, far from being enclosed in a 'black box', are both open to view and of powerful interest.

Several people interviewed pointed out that the AP's 'public participation programme' referred to so uncritically by DNV, instead of involving dissemination of useful information, has featured expenses-paid tours for local people to biomass power plants in Thailand's central region. Such tours, they reported, have included hotel accommodation, food and free visits for some male participants to local prostitutes, but no opportunities for close inspection of the plants in question or chances to meet local people.

Local residents also pointed to AP's name on a pavilion that the company gave to a Buddhist temple adjacent to its factory after temple monks complained about pollution – an act incurring powerful reciprocal obligations. They noted that other modes of persuasion have also been used. One elderly resident interviewed reported receiving no less than three death threats as a result of voicing criticisms of the AP project.

So some of the locals aren't too keen on carbon trading?

Who knows? They understand well what biomass is, but they've never had a chance to discuss the carbon market. Most people are unaware of the AP project's projected role in this new global trade.

South Africa – Carbon credits from the cities

Durban Solid Waste (DSW), part of Durban's city council bureaucracy, manages a landfill site called the Bisasar Road dump. The largest such operation in South Africa and one of the largest in the Southern hemisphere, the dump has been in operation since 1980. Located in an area that was designated for people of Indian descent under apartheid's Group Areas Act of 1961, the dump is also a primary source of livelihood for the mainly African, and poorer, Kennedy Road settlement, established in the late 1980s and now numbering nearly 1,000, who recycle materials from the dump while struggling with officials and business to gain more secure rights to the land their houses occupy.

Although the site is licensed only to receive domestic waste, medical waste, sewage sludge, private corporate waste and large shipments of rotten eggs have also wound up there. Cadmium and lead emissions are over legal limits, and limits for suspended particulate matter also often exceeded. Concentrations of methane, hydrogen chloride, and other organic and inorganic compounds including formaldehyde, benzene, toluene and trichloroethylene are high.

That sounds dangerous.

Local residents report many health problems, with six out of ten of the houses in one downwind block on the nearby Clare Estate reporting cancer cases. The causes of each such individual case of disease are notoriously difficult to pin down. They could include emissions from incineration practices, which stopped in 1997, other emissions from the dump either before or after, or other factors. Lindsay Strachan, Project Manager of eThekwini Engineering and Projects, claims, for example that the Kennedy Road settlement, which burns wood and other materials for heating and cooking, is just as likely as the Bisasar Road dump to be the source of health threats.[135]

But with some houses only 20 metres away from the landfill site

boundary, it's hardly surprising that many in the community want the dump shut down. Under pressure, the city council itself pledged in 1987 to close the site and turn it into sports fields, picnic areas and play areas for children. When, in 1996, the council reneged a second time on the promise, some 6,000 local residents signed a petition of protest, with many blocking the dump site entrance and staging demonstrations and marches. Yet the site was kept open and even started receiving rubbish diverted from a dump in a wealthy white-dominated Durban suburb, which was closing as it was 'earmarked for upmarket property development'.[136]

The Bisasar Road landfill dump.

In June 2002, Clare Estate resident Sajida Khan filed a lawsuit against the eThekwini municipality and the federal Department of Environmental Affairs and Tourism for negligence in permitting the dump to stay open. After three years of delays, the case was due to be heard in the autumn of 2005, but due to Khan's poor health (see below), the case will remain in the docket until she is declared fit enough to participate. In the meantime, the Department of Water and Forestry at the provincial level has been delayed in rendering its decision on an appeal against keeping the dump open, estimated to have cost the city R40,000 to fight.[137]

Very unpleasant, clearly. But what does all this have to do with mitigating climate change?

In 2002, the World Bank's Prototype Carbon Fund (PCF) signed an agreement with DSW to promote a prospective CDM project to ex-

tract methane from the Bisasar landfill and burn it to generate up to 45 megawatts of electricity for supply to the national grid.

I'm not sure I understand. How can a project that emits carbon dioxide using fuel from a smelly landfill site be climate-friendly?

The idea is that the electricity generated by the project would 'replace' electricity that otherwise would have been generated by burning coal. It's claimed that the project would generate enough power to light up 20,000 informal houses or 10,000 formal-sector houses. Because burning methane is less climatically damaging than simply releasing it, and better than burning coal (the dirtier fuel usually used) the project is better than the alternative.

The alternative? There's only one?

'The poor countries are so poor they will accept crumbs. The World Bank know this and they are taking advantage of it.'

Sajida Khan, Bisasar Road community resident

Well, of course, in reality there are many alternatives. But the carbon credit market demands that there be only *one* alternative. If there's more than one alternative, then you'll have more than one number corresponding to the carbon 'saved', and you won't be able to assign a single number to the number of carbon credits your project is producing. So you won't have anything definite to sell.

But how can other alternatives be ignored?

They are classified as 'implausible'.

Sajida Khan

Who says they're implausible? What about using the money to close the dump down and treat some of the waste? What about just pumping the landfill gas into the nearby Petronet gas pipeline network so that it would not need to be burned on site? Or finding ways of using electricity more efficiently? Or more non-fossil community-level power sources? None of these sound implausible to me.

Nevertheless, none of them can be acknowledged as alternatives, because to do so would make it impossible to calculate the credits for the project under consideration. That's one of the ways that a seemingly 'technical' accounting system can help limit the political choices a society can make to small, incremental variations on business as usual.

How was such a one-sided view of the choices available enforced?

In the early phase of the project, authority for deciding what would and would not be possible in South Africa in the absence of the Bisasar Road scheme was quietly given to two individuals at the PCF in Washington, DC – Sandra Greiner and Robert Chronowski.[138] Their decision was clothed in many pages of impressive numbers and reinforced through meetings and professional review.

Didn't anybody question whether two people in Washington had the right to decide what the alternative energy future of Durban might be?

How? Information dissemination and public consultation on the project proposal were carried out over the internet, to which only a small minority of the local community have access. Time allocated for objections in late 2004 was a mere 10 days. And few outside the immediate area were either interested in or aware of what was going on.

Meanwhile, Durban officials claimed that without the USD 15 million provided by the Prototype Carbon Fund, they would not bother trying to recover the methane as fuel, since the electricity generated in the process costs so much more per kilowatt hour than the local power utility charges for its coal-fired power.[139]

The fence separating the dumpsite from the surrounding communities.

All right, fair enough. But assuming that's true, all it proves is that continued raw methane release and coal-fired power is a choice that would have a reasonable economic rationale, not that it is the only choice that could be made.

That's all that's required, under the rules, for the project to create carbon credits.

All right. But who would buy carbon credits from the dump?

All PCF investors get *pro rata* shares of PFC project credits. These investors include British Petroleum, Mitsubishi, Deutsche Bank, Tokyo Electric Power, Gaz de France and RaboBank, as well as the governments of the Netherlands, Norway, Finland, Canada, Sweden and Japan.

Is this a good thing for local people who live around the dump?

That depends a lot on who you ask.

Well, what does the PCF say?

The PCF says that improving the 'financial position of DSW' would also benefit local people and send a 'clear signal' to them that 'the environment is a number-one concern in South Africa and is being dealt with in the best way possible'.

And what does the local community say?

Again, that depends on who you ask. But let's start with Sajida Khan, a member of the Indian community on the border of the dump. Khan, who was diagnosed in 1996 with cancer, and whose nephew died of leukaemia, had this to say in 2002: 'To gain the emissions reductions credits they will keep this site open as long as possible. Which means the abuse will continue as long as possible so they can

continue getting those emissions reductions credits. To them how much money they can get out of this is more important than what effect it has on our lives.'[140]

Khan and some other community members see PCF support for the methane project as having thrown a lifeline to the dump. They note that the PCF's crediting period for the project is seven years, twice renewable, making a total of 21 years. According to the PCF, 'because of the growing waste generation per capita in the municipality…there is no plan to close…the Bisasar Road site…during the PCF project life.' To Khan and colleagues, this new lease on life for the dump, together with the PCF claim that Bisasar Road is an 'environmentally progressive…world-class site' leave a very bitter taste in the mouth.

Understandably so. But are there other views?

One of the municipality's top officials responsible for the project, Lindsay Strachan, has little patience with opinions like Khan's. Because protesters 'can't think globally any more,' he complains, 'the project is literally slipping through our fingers.'[141] Strachan claims the city is committed to closing the dump and continuing to extract methane thereafter, although a carbon project document he helped write states that 'it is not reasonable' to expect that the municipality would close the dump before it is full, and that no plans exist for construction of replacement sites.[142]

'[The Prototype Carbon Fund is after] a cheap bang for their buck; they basically just get the low cost credits…they pillage the country and don't contribute to its sustainable development.'

Sheriene Rosenberg, SouthSouthNorth, South Africa

But there are more than just two sides to this story. Most of the African residents of the nearby Kennedy Road settlement also support extending the life of the dump. For one thing, the dump provides most of their current livelihood. For another, the new World Bank carbon project has shrewdly promised to provide jobs and a few local scholarships. The Bank also pushed DSW to conduct 'consultative exercises' in Kennedy Road, which constituted one of the few occasions that the community had been officially recognised. Kennedy Road residents could not help but contrast that recognition with what they perceive as the Bisasar Road community's lack of sympathy for their ongoing struggles to secure rights to the land they live on so precariously.

But presumably the World Bank and DSW are merely trying to divide the local Indian and African communities from each other?

Kennedy Road activists are no more under any illusions about the agendas of outside agencies than they are in the front line of international debate over climate change. But, as Raj Patel of the local Centre for Civil Society at the University of KwaZulu-Natal observes, when communities have been systematically denied dignity,

'consultations' such as those staged by DSW under World Bank pressure may be the only 'substitute for marginalisation' available.[143]

Patel also observes, however, that as of 2006 the dump 'seems to have receded as a site of struggle' for Kennedy Road residents, 'simply because there are new places and new ways to fight, and bigger things to fight for than the meagre prospect that a family member will get a job picking garbage on the dump.'[144]

In favour of the carbon project, isn't there also the argument that by extracting methane, the scheme not only prevents quantities of a powerful greenhouse gas from being dispersed in the atmosphere, but also benefits local air quality?

The project might clear the air, to some degree – although a lot of associated pollutants would still be released, including carbon monoxide and various hydrocarbons.

Clean air, however, is a right South Africans are constitutionally guaranteed even in the absence of carbon trading schemes. In a sense, therefore, Kyoto commodity production is being staked here to the non-enforcement of environmental law. DSW, PCF and their consultants are helping to enclose not only local communities' air, but also their future. In the process the World Bank is also undermining its own stated concern with 'good governance' and the rule of law, because it's providing an incentive not to enforce the constitution.

What's the future of the project?

Uncertain. Project opponents, backed by sympathisers in a range of countries, have definitely had an impact. Sajida Khan and others have filed formal complaints, citing technical, environmental, health and social problems. Several newspaper articles were published on Khan and her struggles, and in November 2004, World Bank staff were forced to visit Durban to have a look for themselves. In addition, in late August 2005, DSW submitted a Project Design Document to the CDM Executive Board for two much smaller methane projects at La Mercy and Mariannhill, which together would yield only one-sixtieth of the carbon credits of Bisasar Road. Although the two projects had previously been part of a package including the Bisasar Road scheme, the documents conspicuously avoided mentioning it.

Are there other carbon projects afoot in South Africa?

Quite a few. One is a project associated with Sasol, a chemicals, mining and synthetic fuels company so huge – with nearly USD 12 billion in assets and USD 1.4 billion in profits in 2004 – that it has a city named after it.

'What are we going to do about carbon trading? Our president [Thabo Mbeki] is saying, "Where is this project? Where is any project? Where's anything?" [There is] a big rush to get South Africa on the map. [Yet now, due to appeals,] the first project in Africa is stopped in its tracks and… literally slipping through our fingers… Japan is calling me. But I say we have no project… [The 2 per cent of people who object] are saying that this is in my backyard, I can't think globally any more… South Africa probably won't be able to say that we spearheaded the CDM market or better still we spearheaded the emissions reductions market… There is disappointment, but such projects will go on elsewhere, in Brazil or Chile or India or Iran or Kampala.'

Lindsay Strachan, Manager of Engineering and Projects, Durban Solid Waste

Kennedy Road residents on the march for community rights. Many have opposed closing the dump and have criticised opponents of the Bisasar Road CDM scheme.

Sasol is looking for carbon finance for an 865-kilometre pipeline that will carry natural gas from the Temane and Pande fields in Mozambique to its facilities in Sasolburg and Secunda. The gas will supplement coal as the feedstock for Sasol's liquid fuel synthesis processes at its plant at Secunda, a town 100 kilometres west of Johannesburg, and replace it entirely in Sasolburg, which lies 60 kilometres south of Johannesburg.

Sasol justifies its bid for carbon money by claiming that since gas is a cleaner-burning fuel than coal, it will be releasing a massive 6.5 million tonnes less of CO_2 equivalent into the atmosphere annually than it would if it had decided to continue using coal. That makes the project one of the biggest CDM projects in Africa to date.

Bigger than Bisasar Road?

Yes. The project would generate twice the credits of Bisasar Road, even though the emissions it is 'saving' are of carbon dioxide, which is eleven times less potent a greenhouse gas than the methane seeping out of the Bisasar dump.

How does Sasol justify the claim that it's helping the climate?

Without carbon money, Sasol argues in its CDM documents, it would have had to continue using coal as its only feedstock. True, there are signs that the firm was going to diversify its feedstock sources

anyway. Sasol's coal mine in Sasolburg 'reached the end of its economic life in 2001,'[145] and trucking in replacement coal from Secunda was not 'economically sustainable'.[146] Yet the company insists that the obvious choice for a new feedstock source was not gas from Mozambique but rather digging a new coal strip mine near Sasolburg. Although there was 'public concern' over this proposed mine, which would have been sited on the banks of the Vaal river,[147] as well as 'a desire from Sasol and the South African government to reduce local air pollution', the company insists that there was no incentive or legal obligation not to go with coal.[148] The pipeline option, on the other hand, was blocked by 'numerous and difficult-to-manage barriers' including capital costs, political instability, and fluctuating gas prices – all of which needed carbon finance to overcome.

I guess that's reasonable – if you think a fossil fuel company should be granted carbon credits at all.

The only trouble is that Sasol's claims are contradicted by several of its own executives' accounts of how the pipeline option was chosen. For example, at a June 2005 meeting of the South African National Energy Association at the Siemens Headquarters in Sandton, outside of Johannesburg, Sasol's Natural Gas Supply Manager, Peter Geef, noted that the Mozambique pipeline had already been 'completely paid for' and that there were no outstanding financial inputs. Upon being questioned about the CDM, Geef responded that 'yes, we are indeed trying to get some carbon finance for this pipeline…you get a lot of pay-back in terms of dollars per tonne', but that 'we would have done this project anyway'.[149]

'You shouldn't be selling off your crown jewels so the North can keep polluting.'[169]

Sheriene Rosenberg, SouthSouthNorth, South Africa, June 2005

So essentially Sasol is asking for carbon finance not to do something it would not have done otherwise, but as a bonus for what it has already done but just wished was more profitable.

Exactly. Even Richard Worthington of the South African Climate Action Network (SACAN), who supports carbon trading projects in theory, says that the project merely entrenches Sasol's pipeline monopoly. He adds that the company's quest for extra income from carbon credit sales 'is just baseless greed'.[150]

What about the other South African projects you mentioned.

Another South African landfill gas CDM project is located at the Bellville South Waste Disposal (BSWD) dump in the north of Cape Town municipality. This project aims at capturing 70 per cent of the site's methane, instead of the current 30 per cent, which is merely flared.[151] The methane would then be used as fuel by local industry.

Sasol's Sasolburg plant, seen from the south.

Used in the early 1930s for sewage disposal, the site has been a dumping ground since the 1960s. Originally far from human settlement, it is now surrounded by the largely coloured and Indian Belhar community.[152] Although the site was closed for a time due to the 'close proximity to residential areas and the risk of contamination to the underlying Cape Flats aquifer',[153] it was later reopened, enraging local residents, who formed two separate organisations in opposition: the Landfill Monitoring Group and the richer and more Indian-based Belhar Development Forum. Both groups were relieved by the city's pledge to close the site in 2006 but alarmed at negotiations that are now under way to extend its life until 2009.

Does the extension of the life of the dump have anything to do with the CDM project?

Project developer Walter Loots, head of Cape Town Solid Waste, denies this. Cape Town 'is running out of landfill space', Loots says, and 'the only alternative would be a higher-cost regional landfill 60 kilometres out of town'.[154] It hasn't been revealed whether any increase in available gas caused by keeping the dump open was included in the CDM accounting for the project, as was the case at Bisasar Road in Durban.

And who's developing the project?

Unlike the larger Bisasar Road scheme, Bellville is being developed under the close supervision of a non-profit consultancy, South-SouthNorth (SSN), in a municipality in which climate change issues have their own office. It has also gained 'Gold Standard' status as a project meeting the highest standards for environmental and social sustainability.

Sasol gas flaring. Such flaring is alleged by environmentalists to be in breach of South African law.

What's the Gold Standard again?

The Gold Standard was originally an attempt by the World Wide Fund for Nature to correct the CDM's 'failure to demonstrate "additionality" and deliver added environmental and social benefits'.[155] It is now being overseen by the Swiss-based organisation BASE. As discussed in Chapter 3, the Gold Standard gives a special certificate to CDM projects that deliver 'real contributions to sustainable development in host countries plus long-term benefits to the climate'.[156] The associated credits are sold at a premium.

However, it's not clear how a project that is widely opposed by the local community could make a 'by no means insignificant contribution towards local sustainability'. The project can be considered 'ecologically sound,' moreover, only in a very relative sense. As Walter Loots admits, current landfill practices are not sustainable.[157] Organic material and non-organic material are not separated,[158] even though waste sorting could conceivably create badly needed employment. This makes the capture of methane at Bellville 'an inefficient solution to an avoidable problem'.[159] Yet the city can hardly spend money on waste separation and recycling when 155,000 families in informal settlements still have no roadside collection of waste.[160]

'The carbon market doesn't care about sustainable development. All it cares about is the carbon price.'

Jack Cogen, president, Natsource (the largest private buyer of carbon credits)

The Gold Standard doesn't seem to be encouraging projects that have longer-lasting social and environmental benefits for the community, then.

Not in this case, no.

But surely there must be more encouraging examples somewhere that can point a way forward for the carbon market.

Well, there are plenty of positive initiatives in all the countries mentioned in this chapter. Costa Rica has stopped oil exploration in sensitive areas. Indian groups are organising to stop sponge iron production across four states. Thai villagers are working against coal-fired power plants.

The trouble is that such initiatives exist in opposition, as it were, to the carbon credit market, which is designed to *extend* fossil fuel use. If you look for 'alternatives' *within* the CDM and the carbon 'offset' market, you're likely to be repeatedly disappointed.

Let's nail down this point by looking at one final South African CDM project – probably as good a carbon project as you're likely to see anywhere. This is the Kuyasa low-cost housing energy upgrade project. Certified by the CDM Executive Board on 27 August 2005, Kuyasa is the first Gold Standard project in the world to generate certified emissions reductions credits and has been widely applauded both nationally and internationally.

There! That's the sort of example I want to know about. Tell me more.

Well, I'm not sure you'll want to hear it. What Kuyasa shows, in the end, is that such 'good' schemes are unlikely to survive in the carbon credit market and seem virtually incompatible with it.

How do you figure that?

Well, let's go over the history of the project and its virtues first.

Planning for the Kuyasa scheme, located in a neighbourhood in the township of Khayelitsha outside of Cape Town, got underway in 2002. Its pilot phase, launched in July 2003, involved retrofitting eight Reconstruction and Development Programme (RDP) homes and two crèches with insulated ceilings (where there would normally just be a corrugated steel roof), replacing regular lighting with low-watt compact florescent bulbs, and installing solar water heaters on the roofs. Partly because residents would have used grid electricity to heat their water in the absence of the solar heaters, the project is held to reduce demand for coal-fired electricity. The claim is that in total, 2.85 tonnes less CO_2 are generated per household per year as a result of the project. The project's next phase will see the target group expand from 10 to 2,309 RDP homes throughout Kuyasa.

The scheme's pilot phase has been a source of great pride for the project developers – the city of Cape Town and SSN – as well as its

Bellville, viewed from the dumpsite.

beneficiaries. It is also, unusually, actively supported by local residents, who have been consulted from the beginning. Kuyasa's ward development forum put together a broad-based steering committee of community members who assisted in the design of the project, decided which households would participate in it, and mapped out how the project would move forward into its next phase. The steering committee also helped facilitate contacts and a flow of ideas between the community and the project developers.

The project has a particularly high Gold Standard rating in terms of 'social sustainability and local development and has a minimal impact apart from the reduction of GHG on the natural environment'.[161] Kuyasa also creates jobs in installing and maintaining the solar water heaters, which are locally manufactured. Furthermore, the R625 average annual savings on electricity bills can go back into the local economy and create further economic spin-offs.[162]

One pilot project participant, Muzelli, an unemployed man in his thirties confined to a wheelchair, confirmed that he now saves over R600 per year on his electricity bills, which he is able to send back home to support his children still living in the Eastern Cape. When the weather gets cold at night (it can drop below 10 degrees Celsius during winter evenings), all of Muzelli's neighbours come over to visit, as his ceiling keeps the house much warmer than anywhere else in the neighbourhood. Though he admitted that he did not know much about climate change, Muzelli made it clear that people support the project for many reasons, namely the money they save and having warmer houses. 'This

Trusha Reddy researched the Bisasar Road project while she was an intern at the Centre for Civil Society at the University of KwaZulu-Natal and later, as a freelance journalist, Climate Care's light bulb project.

is a good project,' he stated. 'People are very impatient to get their homes upgraded; they really want this project.'[163]

Thus Kuyasa has been held up as an example of the potential of carbon trading both to fight climate change and to improve living conditions in local communities.

This has got to be the future of the carbon credit market, then.

Unfortunately not. The reality is that rather than being an example of what the CDM can deliver, Kuyasa is a testament to what it can't.

What do you mean?

The project can't survive off carbon finance. Instead, it is financed predominantly by one-off government grants, as an explicitly 'public sector project'.[164]

Project proponents estimate that carbon money can cover no more than 20 per cent of the scheme's costs, depending on the spot market price of the Certified Emissions Reductions (CERs) it sells.[165] (The first 10,000 CERs from the project were sold at 15 euros each to the UK to 'offset' jet flights and other emissions associated with the 2005 G8 summit meeting at Gleneagles, Scotland.[166] But 'very few CER purchasers will pay upfront'.[167]) SSN staff member Lester Malengis, who has worked on the scheme for two years, admits: 'This is first a project that uplifts Kuyasa, not a carbon project… . That funding is not sustainable.'[168]

Graham Erion of York University Faculty of Environmental Studies and Osgoode Hall Law School conducted research on Sasol, Bellville, Kuyasa and Bisasar Road while a visiting scholar at the University of KwaZulu-Natal's Centre for Civil Society.

The project is possible only because of generous funding from the national Department of Environmental Affairs and Tourism in Pretoria, the Western Cape provincial government, and Electricité de France (as part of their Corporate Social Responsibility campaign).[169] In addition, SSN and the city of Cape Town have donated hundreds of hours of unremunerated labour. For Richard Worthington of the South African Climate Action Network, Kuyasa has only 'got to where it got to because it's been treated as a charity case. It's been damned expensive and not at all an example of how to put a project together'.[170]

Nor, according to Emily Tyler of SouthSouthNorth, who was closely involved in the development of Kuyasa, has registration as a CDM project helped. 'The CDM actually adds little value (indeed, it adds costs) to the very sorts of projects it was designed to encourage,' Tyler wrote in a whistle-blowing editorial in February 2006. There is, she said, 'no financial value added by the CDM for the project types which most closely fit the CDM's avowed objectives.' Only by

The Voluntary Market Comes to South Africa

In 2005, after two years of being unemployed, Sibiongile Mthembu got lucky.

Mthembu, 24, a lifelong resident of Guguletu, a sprawling township 20 kilometres from Cape Town created under the apartheid era, was recruited off the street by a local energy consultancy to hand out free energy-efficient light bulbs.

The consultancy had in turn been commissioned by Climate Care, a British company, to distribute the bulbs. The idea was that they would replace the more typical and wasteful incandescent variety. After having bought the bulbs (and convinced the city of Cape Town to pay to distribute them), Climate Care was then in a position to sell the CO_2 emissions estimated to have been saved to British consumers and companies who want to 'offset' their own carbon emissions.

The neighbourhoods where Mthembu went about his 10-day temporary job were full of long-standing problems. Houses were crumbling, with faulty wiring, unpainted ceilings and damp walls. Yet at USD 150 per month, when most residents earn considerably less – many from jobs such as selling loose cigarettes and sweets – the rent exceeds what the poor can afford.

'Some people are pensioners,' explained Pat Mgengi, one resident:

'They don't even get that amount of money every month. They tried taking people out of the houses and we put them back. Even after paying the full amount asked some don't have the title deeds. We are going to court time and again. We are just trying to live like any other human being.'

In this community, the light bulbs Sibiongile Mthembu offered around would not ordinarily be on anyone's shopping list. At 15 watts, the compact fluorescent bulbs are far more energy efficient than traditional higher-wattage bulbs and last about 10 times longer. But they cost USD 2.80 each, as opposed to traditional incandescent bulbs at 50 cents, and are not sold locally.

Not surprisingly, Mthembu's bulbs had many takers. Mgengi said he accepted the four that he was offered simply because they were free. 'We just accept what they introduce to us.'

But few local people will be able to afford to buy replacements. And when asked by residents if he would come back to deliver more bulbs if any were broken, Mthembu admits, he and his fellow light bulb distributors had to lie. Of the 69 low energy bulbs reported as broken from the households surveyed by Climate Care two months after the project started, none has yet been replaced.

Climate Care argues that this project is generating real carbon savings, since it would not have gone ahead without the firm's intervention and is 'not required by legislation, not common practice (and) not financially viable without carbon funding'.

However, in the wake of electricity blackouts, power generator Eskom recently decided to provide five million free energy efficient light bulbs to low-income households, among a host of other energy-saving measures. Sibiongile Mthembu is now employed delivering Eskom's energy-efficient light bulbs to 86,000 houses in Guguletu. These are houses that Climate Care missed

out on its 10-day sojourn in Africa in 2005, and that were supposedly not going to receive such bulbs without Climate Care's money.

Among Climate Care's biggest customers for its carbon credits are British Airways and British Gas, both major contributors to climate change. British Gas has recently been in the news for pursuing legal action against Bolivia for taking a democratic decision to nationalize its oil resources. It is currently a partner in two large gas fields in the country and has eight exploration blocks that have not yet started production. British Airways, meanwhile, is busy promoting British airport expansion, ramping up its inter-city commuter flight services, and launching a budget airline to popular short-haul holiday destinations.

Yet Climate Care defends both companies as being among the 'best environmental performers'. 'The climate crisis is so urgent that we should not worry about the motivation of our clients,' the company declares in its 2004 Annual Report.

Source: Trusha Reddy, 'Blinded by the Light', *New Internationalist*, June 2006. Some names have been changed to protect sources.

bypassing the bureaucracy required for quality control at the CDM, seeking extra donor funding, and selling credits on the higher-priced voluntary market to offset emissions from corporate travel, personal lifestyle and so forth, could Kuyasa have broken even.[171]

But maybe later on the project will be able to stand on its own two feet as a commercial proposition.

That seems unlikely. In fact, a special project has had to be set up by the international Renewable Energy and Energy Efficiency Partnership to help clean energy proponents find new sources of funding for Kuyasa-like projects.[172] There has been talk about relying on community residents to cover some costs,[173] allowing manufacturers to lease solar water heaters to low-income communities,[174] and even selling Kuyasa's carbon credits several times on the voluntary 'offset' market as well as through the CDM.

But that last choice would be consumer fraud!

Yes. The more times Kuyasa sold each of its credits, the more greenhouse gas emissions elsewhere it would be licensing. If the project sold even one of its credits twice, the project's net effect on the climate would become negative even on its own carbon accounting. So this was never a serious option and is roundly rejected by SSN.

Does that mean that for the time being, Kuyasa will have to be dependent on the kindness of taxpayers and politicians?

Yes. Unfortunately, it's not as if government has no other funding priorities. Housing activist Peter van Hausen notes, for example, that there is currently a backlog of 260,000 houses that need to be built in Cape Town, and 20,000 more are required each year.[175] This backlog has almost doubled since 1994. In the long term, it is a lot to ask of public authorities that they spend tax money on energy upgrades for people who already own their homes when hundreds of thousands do not.[177]

Thus, while Kuyasa is exactly the type of project that many people hoped the CDM could deliver, now that it exists, the carbon market simply cannot support it. Carbon credit buyers will naturally gravitate towards much less environmentally and socially desirable projects such as Bisasar Road, Bellville or Sasol – assuming any of them come on line.

'The rich developed countries have emitted most of the greenhouse gases currently in the atmosphere and now the more enlightened of them are prepared to pay to further pollute our atmosphere, or more exactly, they will provide money so that they can continue their pollution while we decrease ours.'[176]

South African Climate Action Network, July 2002

Brazil – Handouts for repression as usual

In a carbon project in Minas Gerais, eastern Brazil, carbon trading institutions have used and exacerbated coercive power relations in yet another attempt to produce an imaginary carbon commodity. As in Ecuador and Uganda, the Forest Stewardship Council (FSC) has played a big role and, as in South Africa, the World Bank as well.

Is this another tree plantation project?

Partly, but it's a good deal more complicated. The company claiming to be saving carbon and helping the climate is a pig iron-producing and plantation management company called Plantar S.A.

How is Plantar helping the climate? Is the pig iron it makes produced by solar energy? Or is it perhaps used to make solar cells?

Unfortunately, no. The iron is produced by burning charcoal and releasing carbon dioxide into the atmosphere, and is actually used to make things like cars, which of course release yet more carbon dioxide.

In that case, how can Plantar claim that it deserves carbon credits? It sounds like it's an active part of the industrial system that is accelerating climate change.

Plantar and its colleagues at the World Bank have tried many lines of argument. At first, they said that without carbon finance, there would be an 'accelerated reduction in the plantation forestry base in the state of Minas Gerais, within the next decade, caused by harvesting of existing forests (now in the last cycle of their rotations) and lack of investment into replanting'.[178] In the absence of carbon finance, Plantar and the Bank insisted, 'the company would not invest in the replanting of its forests for the pig iron production, abandoning them after the final harvest of the existing plantations'.[179] When reminded that CDM rules do not allow credit to be provided for 'avoided deforestation', the Bank rewrote its design documents to emphasise other justifications.

Which were…?

First, that Plantar was not avoiding deforestation but rather preventing an otherwise necessary switch in the fuels for its pig iron operations from eucalyptus charcoal to more carbon-intensive coal or coke.

Let me get this straight. This company says it deserves carbon credits for not doing something?

That's right. Plantar claims that without carbon money, the company would switch over from using charcoal to using fossil fuel. It's called an 'avoided fuel switch'. Because the carbon dioxide released by the charcoal is supposedly mostly absorbed by the new trees grown for new charcoal, less carbon enters the atmosphere than would enter it from the burning of coal.

But why would Plantar switch over to using coal? Isn't there enough charcoal to go around?

Plantar claims that without extra carbon finance for a 23,100-hectare plantation scheme, the charcoal-fired pig iron industry would face a 'supply bottleneck'. It says current plantations are being depleted and the lack of forest incentives will render new plantations financially unfeasible without World Bank carbon financing.[180] Plantation land will be 'converted to pasture or agricultural land'.[181]

Is that true?

Well, it does somewhat strain credulity. Plantar is saying that carbon credits for its 23,100 hectare project are the only thing that can ensure charcoal supplies, even though Minas Gerais alone boasts 2 million hectares of eucalyptus plantations. Plantar itself owns rural properties covering more than 180,000 hectares, mainly devoted to eucalyptus for charcoal and almost all located in Minas Gerais,[182] and provides management services for more than 590,000 hectares of plantations for itself and other companies in Brazil spread across 11 large units.

The firm also has large investments in the development and production of high-yielding clonal eucalyptus varieties and is reported to be producing over 40 million clonal seedlings per year,[183] with yields of 35-42 cubic metres per year, contributing to its reputation as a committed, low-cost and highly competitive producer of charcoal and many other plantation timber products.[184] In addition, Plantar has recently gone to the trouble of getting plantations it uses to produce barbeque charcoal certified by the FSC.

Why should the failure to get carbon credits for only 4 per cent of the total area under the firm's management and 13 per cent of its own direct holdings result in a failure to invest in replanting? If the financial prospects for new plantation development are so poor, why did Plantar purchase the lands in question before it was considering carbon finance?

Some 143 local groups and individuals put it more strongly in a letter to the CDM Executive Board of June 2004:

> [T]he claim that without carbon credits Plantar…would have switched to coal as an energy source is absurd… Yet now [Plantar] is using this threat to claim carbon credits for continuing to do what they have been doing for decades – plant unsustainable eucalyptus plantations for charcoal… It is comparable to loggers demanding money, otherwise they will cut down trees… [The CDM] should not be allowed to be used by the tree plantation industry to help finance its unsustainable practices.[185]

Even the project's validator, Det Norske Veritas (DNV), a Norwegian 'risk management' consultancy, admitted to being sceptical about Plantar's claim that it would not invest in replanting in the absence of the CDM project, 'given Plantar S.A.'s relatively strong investment capabilities as one of the major eucalypt seedling producers in Brazil'.

How did DNV check Plantar's claim?

They simply went to Plantar and asked them if it was really true or not. Unsurprisingly, Plantar executives assured them that the 'internal

rate of return for planting new trees today is not attractive in absence of the sale of CDM credits'.

Meanwhile, the World Bank and its consultants admit that there are several possible 'land management scenarios for the Curvelo ranch in the absence of the carbon project'.[186]

That means that there are several possible baselines with different carbon profiles.

Yes.

That means that there are several different figures for how much carbon the project might save.

Yes.

That means that there can be no single number of carbon credits generated by the project.

No, there can't.

Doesn't that bother the project accountants?

No. They simply choose the baseline scenario they claim is 'most plausible' and discard the others.

So there's actually no scientific basis for assigning any particular number of carbon credits to the project?

No. It's essentially arbitrary. What's more, even if Plantar could prove that it was avoiding the use of a quantifiable amount of coal in Minas Gerais, it would still have to prove that the coal would not be used somewhere else for 10, 50, 100 or 300 years. Or it would have to quantify the extent to which its local avoidance of fossil fuels was helping indirectly to build an alternative, non-fossil energy economy worldwide. In the end, it's anybody's guess how Plantar's carbon credits are related to climate.

Revealingly, even those technocrats who are committed to the idea of carbon-saving projects are beginning to be uneasy about companies' demands to be given carbon money for what they are doing already. In January 2003, the CDM Methodologies Panel rejected the claim of another 'avoided fuel switch' carbon project located adjacent to Plantar's that it was an improvement on 'business as usual'.[187] In November 2003, the project submitted another accounting methodology. But the Panel was still unsatisfied. Could carbon-saving projects that merely continue current practice really be 'additional'? The panel decided that the claim throws up problems of 'moral hazard'.[188]

'Moral hazard'? What does that mean?

It's a term often used in the insurance business. By insuring houses, for example, an insurance company, if it's not careful, can create an incentive for its customers not to take proper precautions against fire. Similarly, offering businesses a way of getting subsidies for what they're doing already, without any way of verifying their claims about what would happen otherwise, creates incentives for them not to make any improvements.

Are there other justifications Plantar cites for getting carbon credits?

Several. Plantar has also looked to get carbon credits for afforestation; improvements in charcoal production that minimise methane releases; rehabilitating *cerrado* (savannah), the biome it itself has had such a hand in depleting; and improving grasslands.

What do local people make of all this?

They find it hard to believe that Plantar could secure extra finance for anything that falls under the rubric of 'environment' or 'development'.

'We were surprised and bewildered by the news', a group of over 50 trade unions, churches, local deputies, academics, human and land rights organisations and others protested in a letter of 26 March 2003.[189] They see the company as having illegally dispossessed many people of their land, destroyed jobs and livelihoods, dried up and polluted local water supplies, depleted soils and the biodiversity of the native *cerrado* biome, threatened the health of local people, and exploited labour under appalling conditions (see 'Plantar vs. local people – Two versions of history', on page 309).[190]

So they see the carbon scheme as shoring up an unjust and destructive social arrangement.

Yes. But local residents oppose not only the way Plantar is trying to get paid for using former *cerrado* and farmland for a carbon dump. They also oppose the way the carbon project appropriates alternative futures that they are pressing for:

> The argument that producing pig iron from charcoal is less bad than producing it from coal is a sinister strategy… What about the emissions that still happen in the pig iron industry, burning charcoal? What we really need are investments in clean energies that at the same time contribute to the cultural, social and economic well-being of local populations… We can never accept the argument that one activity is less worse [*sic*] than another one to justify the serious negative

Conducting research into the story of Plantar have been Marcelo Calazans (below) and Winnie Overbeek of the Brazilian NGO FASE-ES in Espirito Santo, assisted by an international team working on carbon trading more generally including, (next page from top) Adam Ma'anit and Heidi Bachram of Carbon Trade Watch, Jutta Kill of Sinks Watch, and Ben Pearson of Clean Development Mechanism Watch (and now with Greenpeace Australia).

> impacts that Plantar and its activities have caused… [W]e want to prevent these impacts and construct a society with an economic policy that includes every man and woman, preserving and recovering our environment.[191]

In the face of all this opposition, how does the project go forward?

The scheme probably couldn't have got off the ground without the help and sponsorship of the Prototype Carbon Fund (PCF) of the World Bank, which would feed any credits it generates to its roster of Northern corporate and government clients. Plantar was the Bank's first carbon sink project and the Bank expected it to 'prepare the ground for similar projects in the future'.[192] Plantar's carbon scheme also gains legitimacy from the involvement of the FSC, as do similar schemes in Ecuador and Uganda (see 'From the Netherlands to the Andes – A tale from Ecuador' and 'The story continues – carbon forestry in Uganda').

What if Plantar can't deliver the credits? Suppose the plantation burns down or the project verifiers find problems with the carbon accounting?

One of the buyers of Plantar's carbon credits, The Netherlands, insists that if more than 30 per cent of its credits are delivered late, Plantar will have to pay a penalty. The World Bank would get off without paying anything.

But doesn't the involvement of the World Bank, as an internationally reputable development institution, at least guarantee certain environmental standards and provide safeguards against abuse of local people?

On the contrary. Many local people feel that the Bank's involvement merely legitimises environmental damage and the intimidation that Plantar uses to control local people – intimidation which, as in Thailand, is nowhere acknowledged in carbon project documents.

Many local residents are afraid to let interviewers cite their names. Some receive death threats. When a representative of the Rural Union of Workers of Curvelo went to the climate negotiations in Milan in December 2003 to raise awareness about the negative environmental and social effects of Plantar's operations (which won a special ironic NGO award there for 'worst CDM sinks project'), the company's directors bullied other union members into signing a letter of support for the company, threatening massive layoffs if carbon credits were not forthcoming. (One longstanding union opponent of the expansion of eucalyptus plantations in Minas Gerais did manage to insert the legible notation 'under pressure' beside her signature.)

Plantar: Local People Speak

'Plantar has planted all over, even up to the Seu Zé do Buritim river spring. Thirty-five thousand hectares of land…they sprayed pesticides with a plane. There used to be deer and other animals in the area. The native fauna lived together with the cattle. But since they applied the pesticide, every one of them got killed… The eucalyptus planted over here is meant for charcoal. It is a disaster for us. They say it provides jobs, but the maximum is 600 work places in a plantation of 35,000 hectares. And, whenever everything has been planted, one has to wait for six years. So, what work does it generate? … We used to produce coffee – the Vera coffee – and pasta and cotton. Several different little factories in their suitable regions. Nowadays, there is only the eucalyptus. It has destroyed everything else… Why do they come to plant in the land suited for agriculture instead of more suitable areas? Because there it takes 10 to 20 years and over here only seven. All the best pieces of land went to the eucalyptus plantations, pushing the small producers away and destroying the municipalities… These companies don't want unions. They immediately co-opt the union leaders and they begin to make them part of their inner circle of managers and directors… The eucalyptus gives the water back to the earth after some years. But when it is time to give it back, they plant a new one that will absorb the water returned by the old one. This new plantation will develop really quickly, because, besides the rainwater, it will receive the water from the old eucalyptus…they are using the carbon credits to plant these eucalyptus that will grow very quickly.'

Local man who asked for anonymity out of fears for his safety, 2003

'Eucalyptus has been grown with blood.'

Antonio, local farmer, 2003

Unbowed, the local movement has subsequently appealed directly to European investors not to put money into the Plantar carbon project. Peasant and trade union representatives travelled to Cologne to intervene in the Carbon Expo trade fair held there in June 2004, in which the Bank participated.[193]

Throughout the disputes over the carbon project, the World Bank has taken the side of Plantar. For example, in 2003 it posted on its website a letter from Plantar to PCF investors replying to dozens of local groups, without posting the original letter to which it was a reply.

What about FSC? How are they involved?

FSC has certified only 32,232 hectares of Plantar's operations – less than 18 per cent of its landholdings.[194] These hectares are used to produce barbeque charcoal, as well as charcoal that would be used for the PCF project. However, Plantar has not hesitated to announce on its website that certification 'ensures that our forest is managed in an environmentally responsible, socially beneficial and economically viable way'. This

gives the impression that FSC's certificate is valid for all of the company's plantations. It also claims in a letter to PCF investors that '100 per cent of the Project Area is being and will be certified'.[195]

As in Ecuador, FSC thus has a hand, if only an indirect one, in producing a fictitious commodity claiming to be 'carbon'.

Photo Essay
Plantar vs. local people – Two versions of history

Demonstration in early 2005 against the 'green desert' created by commercial eucalyptus plantations established by Plantar and other companies.

Local People: Before the advent of giant eucalyptus plantations, the inhabitants of the *cerrado* (savannah) of northern Minas Gerais used the savannah for crops, cattle, wild foods, medicines and crafts. Small and medium-sized companies relied on *cerrado* products to manufacture pasta, leather, saddles, shoes, cotton oil, textiles, castor oil, textiles, sweets, and liquor and other products of the native *pequi* fruit.

Rice, beans and maize were planted and traditional dairy farming and livestock-raising was practised. Under the dictatorship, however, lands that the *geraizeiros*, or *cerrado* inhabitants, had traditionally used and claimed ownership over, but which were not formally titled and were under the jurisdiction of the state (*devolutas* lands), were leased fraudulently for 20 years to eucalyptus-planting firms, who also received financial incentives. Many rural dwellers were expelled from the land, while others were persuaded to abandon it by promises of jobs and better living conditions; still others sold up after becoming isolated and seeing their water supply dry up or become contaminated with pesticides. The *cerrado* was cut down, fields were fenced and consolidated, and agriculture, stock-raising and food products factories, which depended on the biodiversity of the *cerrado*, collapsed, leaving many unemployed. Through dispossession and impoverishment, residents have been forced to accept low wages and dangerous working conditions, often as illegal out-sourced labour, or flee to *favelas* on the outskirts of cities, where they are also trapped in a cycle of poverty.

Exactly how much of Minas Gerais' monoculture of eucalyptus plantations today is on *devolutas* lands is disputed, but the area is large. An investigative commission of the Minas Gerais parliament found that iron and steel companies were granted 'a large part of the *devolutas* lands in northern Minas Gerais'. Whatever the exact figure, however, the question must be investigated, since according to Brazilian law, corporations cannot acquire this type of land, only peasants. By right, such lands should be given back to rural dwellers and used food production, and restoration of the *cerrado*. Many *geraizeiros* have brought a case against the state over their expulsion from their land when it was expropriated and leased to the companies. They want to convert plantations back into native *cerrado*.

Plantar: Plantar has never owned nor used any so-called *devolutas* lands. It has never contributed to the eviction of indigenous peoples. Plantar has never placed any constraints on the commercialisation of *cerrado* fruits, on which a few families may rely to earn their living, or on those who collect fruits for subsistence purposes. It is very hard to imagine how a company that does not occupy more than 4.5 per cent of the Curvelo Township area could cause a crisis in the fruit-collecting economy. Besides preserving both legal reserves and permanent conservation areas, Plantar also contributes to the conservation of traditional species of the *cerrado*. Anyway, the areas where Plantar works are not economically dependent on *cerrado* products but on cattle-raising. This has heavy environmental impacts, adds little value, and creates fewer employment opportunities than are created by the forestry industry. For example, in Felixlândia, Plantar acquired

Some of Plantar's plantations from the air.

a former cattle-raising farm which did not provide more than 20 jobs. In the same area, we currently have almost 300 permanent employees. In Curvelo, Plantar provides more than 1000 direct jobs, not to mention indirect ones. Plantar has not caused massive job layoffs and has significantly expanded due to forestry management services provided to third parties.

Locals: The 4.5 per cent figure doesn't include other companies' eucalyptus plantations in Curvelo, including those of Cossisa and Vallourec & Mannesmann Florestal (a company that is also trying to get carbon credits for maintaining a plantation operation that has displaced local people). In any case, knowing that Plantar has covered 4.5 per cent of the municipality with eucalyptus does not change the plantations' impacts on the lives of people nearby. Plantar's comparison between the 20 workers on a former cattle ranch and the 300 workers working there now is misleading. No local people were in fact hired. Unemployment in Felixlândia in fact increased. In addition, while eucalyptus plantations may provide employment during the first two years – in preparation of the land, planting, pesticide application or irrigation – they provide very little work during the subsequent five years before cutting.

It's true that local people do not use *cerrado* areas under Plantar's control for fruit collection. These areas are very small and offer little. But local communities have suffered from Plantar's restrictions on their tradition of letting their cows graze freely. Plantar has put cattle in fenced areas or taken them away to another area without informing the owner. This has led to cases of lost cattle. Land reform and small-scale agriculture are the only ways of creating a future for the Brazilian rural population. Tree plantations only worsen the unequal distribution of land in the country. In Espirito Santo, eucalyptus plantations expelled thousands and thousands of people into the poor neighbourhoods of urban centres and an uncertain future. Turning over the 23,100 hectares of the Plantar project to small-scale diversified and ecological agriculture would create at least 23,100 more human-friendly jobs, with salaries at least four times higher than those of the majority of Plantar workers, according to the concrete experience of the local Movimento dos Pequenos Agricultores (Movement of Small Peasants). The Movement is also developing an alternative reforestation project, using not eucalyptus but tree species with multiple uses and local environmental value.

Harvest time on Plantar's plantations.

Locals: What with the eucalyptus industry's transformation of local rural society, people often have no livelihood options other than small-scale charcoal production, and build clay ovens in the *cerrado* for the purpose. Collecting commercial eucalyptus is against the law, however, so independent producers often burn what's left of native trees, and the resulting charcoal is often eventually purchased by the corporations. Although the companies are legally allowed to use a certain percentage of charcoal made from native *cerrado* trees as long as it comes with a certificate, they are said to pay more for native charcoal *without* the certificate. This allows them to use more than the legal amount of native charcoal. Companies still use around 15–20 per cent native charcoal.

Plantar: The use of charcoal made out of native vegetation is a reality that bothers pig iron manufacturers, environmentalists and authorities alike. That's why it's a goal of the Plantar project to establish sustainable plantations, capable of supplying 100 per cent well-managed eucalyptus plantation charcoal for pig iron manufacturing, thus curbing negative impacts brought by the use of native vegetation.

Forest clearance for Plantar plantation.

Locals: Plantar also continues to destroy *cerrado* directly in order to use the land for plantations. For instance, Plantar bought *cerrado* lands in the Campo Alegre and Paiol communities in Minas Gerais and planted eucalyptus on it. As late as 2000, Plantar was felling *cerrado* in Lagoa do Capim. In December 2002, Plantar land was also cleared at the river spring of Pindaíba. Native tree trunks can still be seen there. Dozens of municipalities have declared a state of emergency over water. Near Paiol de Cima, one stream has completely dried up after having previously flowed 11 months of the year. In Felixlândia, a spring called Cabeceira do Buriti is degraded. Flows in the Buriti river are down and herbicides have been applied without consultation

Plantar eucalyptus plantation with dead native *buriti* tree in the foreground. The *buriti* is a symbol of the *cerrado* region whose wide river basins it thrives in. The tree needs a lot of water to survive, and its demise shows that water levels have dropped.

Dried-out swamp forest near abandoned farm, October 2003.

with local people, killing fish and birds. Plantar has planted eucalyptus at river springs, drying them up and also contaminating them with pesticides that kill animal life in the streams. Plantar's contamination of local drinking water sources with pesticides has also caused the death of many emas, large land birds related to ostriches. The communities of Cobú, Paiol de Cima, Canabrava and Boa Morte have been forced to dig artesian wells. Cattle-ranching does not cause such negative impacts on water, and produces a greater diversity of goods, including meat, milk, leather and manure.

Plantar: We have been accused of drying up rivers, but in fact some streams dry up naturally for a few months, due to the seasonality of rainfall normal to the *cerrado*. They recover later. Of course, as with any fast-growing species, eucalyptus needs underground water. Nevertheless, scientific studies have shown that, as long as they are properly managed, as our plantations are, eucalyptus plantations do not reduce water supply to specific regions. Careless grazing and other traditional practices are more harmful to hydrological systems than eucalyptus plantations.

Locals: A Minas Gerais Parliamentary Investigation Commission found in 2002 that Plantar was practising illegal outsourcing of labour that negatively affected the safety and livelihoods of charcoal workers. It cited 'precarious labour relations, abominable working conditions, slave and child labour and deforestation of the *cerrado*' as well as 'infamous' wage levels. It also found problems with housing, hygiene, drinking water, food and transport, and noted that Plantar was in breach of International Labour Organisation provisions regarding freedom of trade union organising. The Federal Public Ministry of Labour has sued Plantar for illegal subcontracting and forced it

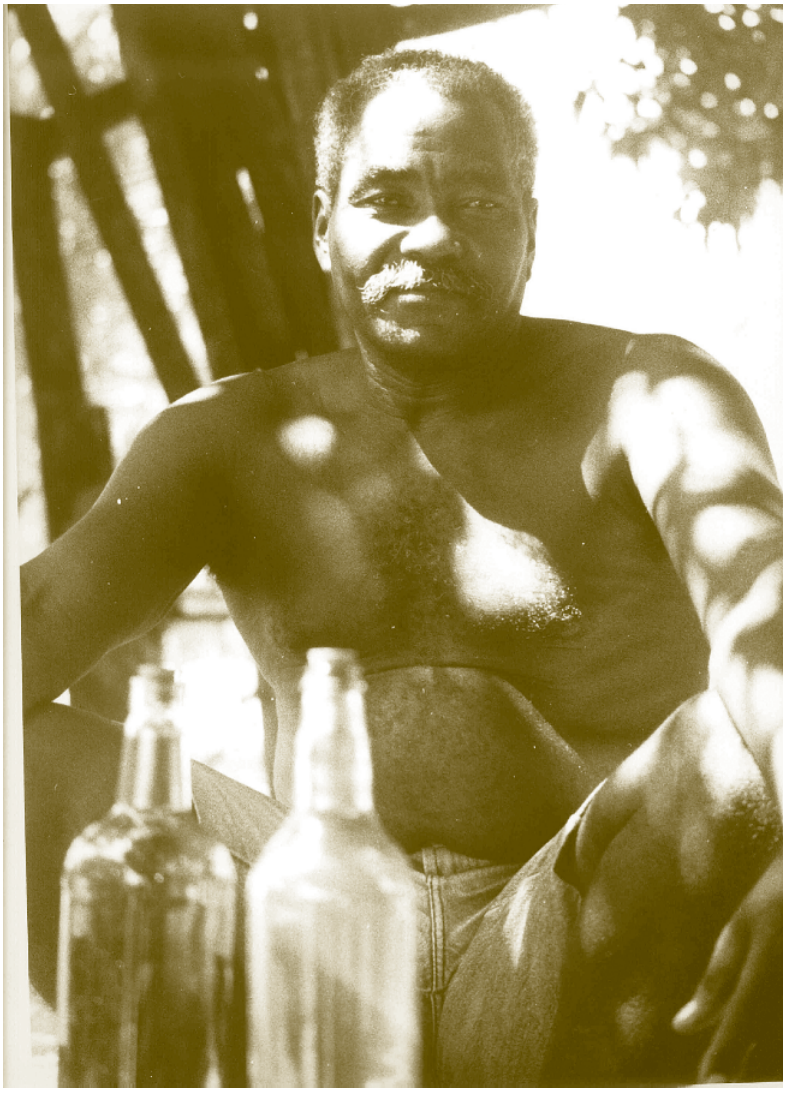
Quilombola charcoal workers. The *quilombola* are descendants of African slaves who, during the colonial era, escaped from farms to the hinterland, where they founded their own communities with their own distinctive culture, which survives today.

to sign an agreement to change its behaviour, which was subsequently found not to be in compliance. During the 1990s, the Montes Claros Pastoral Land Commission, a church-related organisation, also verified the existence of slave labour on Plantar property. In March 2002, the Curvelo Regional Labour Office (DRT) issued Plantar with a summons for using slave and child labour in timber extraction and charcoal production and fined the company after finding 194 workers without any registration on its plantations in Curvelo.[196]

Plantar charcoal ovens.

Plantar: Plantar has never used child labour or slave labour. Our working conditions are in complete accordance with labour laws. Besides complying with Forestry Stewardship Council standards, the company is frequently audited under its International Standards Organisation-certified quality management system and is certified by ABRINQ Foundation as a 'child-friendly company'. Representatives from the Intergovernmental Panel on Climate Change have visited Plantar's facilities. Plantar may have been cited over working conditions by a Parliamentary Investigation Commission (along with every other company in the sector), but no irregularities were found. The benefits provided to employees are a benchmark for the industry and include occupational health care, half scholarships for all employees from basic education to graduate degrees, and free meals and food supply kits to lower-income employees. Instead of undertaking a legal dispute with the Curvelo Regional Labour Office (DRT) after being cited over outsourcing, Plantar has already agreed to manufacture charcoal with its own workforce.

Locals: Plantar's agreement to manufacture charcoal with its own workforce needs to be evaluated to see whether it is really improving conditions for workers, who in general earn a maximum of only USD 100 a month. As unemployment is rife, most workers are frightened of mentioning any problem that occurs, including the creation of new contracting companies nominally part of Plantar with names like Plantar Energética. Plantar charcoal workers are continuously exposed to smoke containing toxic gases as well as pesticides and are at a high risk of accidents. In Espirito Santo, the Attorney General for Workers' Conditions opened a confidential investigation in



Jorge, a former Plantar worker: 'When I started working at Plantar I was OK. One day I fainted after lunch. I was already applying the insecticides, fungicides. I had headaches, I felt weak. My superior told me, "I am firing you because you don't know if you are sick or not." Six or seven people died. Plantar said it was heart failure. Now I'm unable to work. I don't dare eat the fish from the streams here.'

2001 after the death of several former Plantar workers. One, Aurino dos Santos Filho, died with a pump filled with pesticides on his back while working on a eucalyptus plantation in Espirito Santo in 2001; he was only 34 years old. Aurino's family has not received any compensation from the company. Plantar does nothing for workers who become disabled as a result of their work for the company; many have already died. Plantar makes labour organising difficult by rotating workers among far-flung sites. Worker leaders are registered as 'urban labourers' to prevent them from becoming rural union members.

Quilombola charcoal worker.

Locals: When it built a new tree nursery, Plantar, without consulting local inhabitants, diverted a road that has always been used by the communities of Paiol de Cima, Meleiros, Cachoeira do Choro, Paiol de Baixo, Canabrava, Gomos and others, extending travel distances for local inhabitants, including 900 students from the Serfio Eugenio School, by more than five kilometres. Plantar also dammed up the local Boa Morte river to supply the nursery with water, as well as polluting water with fertilisers and other agrochemicals, causing complaints from downstream water users.

Most of the photographs and information in this section are courtesy of Tamra Gilbertson of Carbon Trade Watch and form part of an international exhibition developed by her on the Plantar case.

Plantar: The detour has not caused any damage to local people. The original route is still there and can be used by pedestrians, cyclists and horse riders. Vehicle traffic has been diverted to prevent seedlings from being affected by dust, and drivers prefer to take the detour anyway because the road is of better quality. Public and school buses no longer get stuck in the mud during rainy periods.

Locals: In 2003, the old road was fenced off, making it impossible even for pedestrians to use. Even for anyone daring to jump the fence, the road is unusable, since it is blocked by the company's nursery. School buses never had problems with the old road.

With the help of Carbon Trade Watch, different generations (above and below) learn how to film their struggle to share with outsiders, including communities near a BP refinery in Scotland. The carbon credits BP obtained from Plantar and other carbon projects would allow it to maintain high levels of fossil fuel pollution in Europe.

1 Freeman J. Dyson, 'Can We Control Carbon Dioxide in the Atmosphere?', *Energy* 2, 1977, pp. 287-291.

2 Paul Faeth *et al.*, *Evaluating the Carbon Sequestration Benefits of Forestry Projects in Developing Countries*, World Resources Institute/ EPA, Washington, 1994; Sandra Brown *et al.*, *Carbon Sequestration Final Evaluation: Final Report to CARE Guatemala for PNO3 Agroforestry Project*, Winrock International, Arlington, VA, 1999. The project also featured the first ever 'additionality' analysis; that is, an analysis that claimed the project deserved carbon credits because it would not have happened without the sponsoring corporation's concern about climate change. See Mark Trexler *et al.*, 'Forestry as a Global Warming Mitigation Strategy: An Analysis of the Guatemala Carbon Sequestration Forestry Project', World Resources Institute, Washington, 1989.

3 See www.careusa.org/careswork/project.asp.

4 *World Rainforest Movement Bulletin* No. 37, August 2000, available at www.wrm.org.uy/bulletin/37/ Camerica.html; and www.careusa.org/careswork/ project.asp. Guatemala Agroforestry estimates 100 tonnes of carbon sequestered per hectare for forests and 30 tonnes for regrowth.

5 Brown *et al.*, *op. cit. supra* note 2.

6 World Bank, *Guatemala – Integrated Management of Natural Resources in the Western Altiplano (MIRNA). Project Appraisal Document*, World Bank, Washington, 2001.

7 Larry Lohmann, 'Democracy or Carbocracy? Intellectual Corruption and the Future of the Climate Debate', Corner House Briefing No. 24, 2001, pp. 36-44, http://www.thecornerhouse.org.uk.

8 Brown *et al.*, *op. cit. supra* note 2.

9 Verónica Vidal, *La Aplicacion de Politicas sobre Cambio Climatico en el Sector Forestal del Ecuador*, Memoria de Investigación Doctorado en Gestión Ambiental y Economía Ecológica, Autonomous University of Barcelona, October 1999.

10 Since 1994, PROFAFOR has arranged forestation contracts in the provinces of the Ecuadorian Sierra: Imbabura, Pichincha, Chimborazo, Cañar, Azuay and Loja. It has also signed contracts in coastal provinces, in the buffer zone of the Mache-Chindul Ecological Reserve within the polygon formed by El Carmen, Pedernales, Cojimíes, Muisne, Atacames, Bilsa and Quinindé – that is to say, in the north of the province of Manabi and in the south of the province of Esmeraldas.

11 Robert Hofstede, 'Impactos Ecológicos de Plantaciones Forestales', in Robert Hofstede *et al.*, *Geografía, Ecología y Forestación de la Sierra Alta del Ecuador: Revisión de Literatura,* Editorial Abya Yala, Ecuador, 1998. See also Robert Hofstede, La Importancia Hídrica Del Páramo y Aspectos de Su Manejo, EcoPar, August 1997.

12 Vidal, *op. cit. supra* note 9.

13 G. Medina *et al.*, 'El Páramo como Espacio de Mitigación de Carbono Atmosférico, Serie Páramo, 1', GTP/Abya Yala, Quito, 1999, quoted in Veronica Vidal, 'Impactos de la Aplicación de Políticas sobre Cambio Climático en la Forestación del Páramo de Ecuador', *Ecología Política*, No. 18, 1999, pp. 49-54.

14 See http://www.stichtingface.nl.

15 *Ibid.*

16 See also C. Borga *et al.*, *Plantas Nativas para Reforestación en el Ecuador*, Fundación Natura, Quito, 1980.

17 See http://www.stichtingface.nl.

18 Mary Milne, 'Transaction Costs of Forest Carbon Projects', Center for International Forestry Research, available at http://www.une.edu.au/febl/ Economics/carbon/CC05.PDF.

19 Montserrat Alban and Maria Arguello, *Un Análisis de los Impactos Sociales y Económicos de los Proyectos de Fijación de Carbono en el Ecuador: El Caso de PROFAFOR-FACE*, International Institute for Environment and Development, London, 2004.

20 The agreement was signed using as a reference a document from the property registry and some false title deeds.

21 Harald Eraker, 'CO_2lonialism: Norwegian Tree Plantations, Carbon Credits and Land Conflicts in Uganda', NorWatch/The Future in Our Hands, Oslo, 2000.

22 NORAD, letter to NorWatch, 30 March 2000.

23 Trygve Refsdal in telephone conversation with Harald Eraker, March 2000.

24 *Ibid.*

25 B. Koppers, *Social Impact Assessment of the Proposed Natural Forest Resources Management and Conservation Program*, K Consult, Oslo, October 1999.

26 D. N. Byarugaba, Commissioner for Forestry, 'Utilisation of Bukaleba Forest Reserve', 25 January 2000. An MP, Bunya West, wrote an open letter dated the same day which reacted harshly to a proposed solution for the land conflict put forward by a parliamentarian from the district on behalf of Norwegian and German concessionaires. The proposal entailed that while those only engaged in fisheries could keep a landing site for fishing boats, other intruders had to leave the reserve by the end of July that year.

27 John R. W. Aluma, 'Report on Environment Impact Assessment of the Management Plan for Bukaleba Forest Reserve under Busoga Forestry Company Limited', consultant's report, September 1999.

28 The company's environmental impact assessment, too, has noted the fears of local people: 'The [local] communities have expressed very strong desire to be permitted to continue to stay there [in the reserve] as it would be extremely difficult to find alternative locations and activities for livelihoods.' Yet the summary of the impact assessment states that the farmers and fishermen 'consider the project as a positive socio-economic development' for the area. *Ibid.*

29 Koppers, *op. cit supra* note 25.

30 Nsita Steve Amooti, Forest Officer, 'Field Visit to Bukaleba Forest Reserve', 24 November 1999.

31 According to one report, farmers must also pay a cash rent ranging from 10,000 to 85,000 Ugandan shillings per hectare, at a time when Tree Farms is only paying 5,000 shillings per year to the authorities for every hectare planted with trees. *Ibid.*

32 Koppers, *op. cit supra* note 25.

33 Amooti, *op. cit. supra* note 30.

34 Odd Ivar Løvhaugen, email to Harald Eraker, 20 January 2000.

35 Intergovernmental Panel on Climate Change, *Special Report: Land Use, Land-Use Change, and Forestry, Draft Summary for Policymakers*, Oxford, Oxford University Press, 2000.

36 Koppers, *op. cit supra* note 25.

37 Trygve Refsdal, email to Harald Eraker, 24 March 2000.

38 As noted in the previous section, FACE Foundation (Forests Absorbing Carbon-Dioxide Emissions) contributes financially to the 'reforestation' of about 150,000 hectares worldwide. FACE is an initiative of the Dutch Electricity Generation Board.

39 According to a Societé Générale de Surveillance (SGS) assessment report done in 2001, the project is expected to result in an increase in the average storage capacity of 3.73 million tonnes of carbon dioxide over its 99-year lifespan. SGS is the world's largest inspection, verification and testing organisation.

40 *New Vision*, Monday, 15 April 2002. *New Vision* is Uganda's leading daily newspaper.

41 Chris Lang, 'Uganda: Face Foundation, Carbon Conflict and FSC Certification', *World Rainforest Movement Bulletin* 101, December 2005, www.wrm.org.uy.

42 *New Vision*, 30 June 2004.

43 Miriam van Heist, *Land Unit Map of Mount Elgon National Park*, IUCN technical report, Gland, unpublished, 1994.

44 Lang, *op. cit supra* note 41.

45 Axel P. Gosseries, 'The Legal Architecture of Joint Implementation: What Do We Learn from the Pilot Phase?' *New York University Environmental Law Journal* 7, 1999, pp. 99-100.

46 Michael Dutschke and Axel Michaelowa, 'Joint Implementation as a Development Policy – The Case of Costa Rica', HWWA Discussion Paper No. 49, 1997.

47 M. Alfaro *et al.*, 'Evaluación del Sector Forestal de Costa Rica para la Mitigación del Cambio Climático en el Marco del MDL: Informe Final', Proyecto Bosques y Cambio Climático en América Central, Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO), Comisión Centroamericana de Ambiente y Desarrollo (CCAD), San José, Costa Rica, 2003.

48 'The Marrakesh Accords and the Marrakesh Resolution', www.unfccc.int/cop7/documents/accords_draft.pdf.

49 Alfaro *et al.*, *op. cit supra* note 47.

50 *Ibid.*

51 At present most of the timber consumed by the country comes from wooded grasslands. For example, in the year 2001 alone, approximately 260,000 cubic metres of timber were legally extracted from some 170,000 hectares of wooded grasslands, amounting to 3 per cent of the national territory (*Estado de la Nación*, San Jose, 2003).

52 See Paul Harremoës *et al.*, *The Precautionary Principle in the 20th Century: Late Lessons from Early Warnings*, Earthscan, London, 2002.

53 See, for example, P. B. Reich *et al.*, 'Nitrogen Limitation Constrains Sustainability of Ecosystem Response to CO_2', *Nature* 440, 13 April 2006, pp. 922-925; D. A. Stainforth *et al.*, 'Uncertainty in Predictions of the Climate Response to Rising Levels of Greenhouse Gases', *Nature* 433, 27 January 2005, pp.403-07; W. Knorr *et al.*, 'Long-Term Sensitivity of Soil Carbon Turnover to Warming', *Nature* 433, 20 January 2005, pp. 298–302; D. Read *et al.*, *The Role of Land Carbon Sinks in Mitigating Global Climate Change*, Royal Society, London, 2001; R. Gill *et al.*, 'Nonlinear Grassland Responses to Past and Future Atmospheric CO_2', *Nature* 417, 16 May 2002, pp. 279–283; J. G. Canadell *et al.*, 'Quantifying, Understanding and Managing the Carbon Cycle in the Next Decades', *Climatic Change* 67, 2–3, 2004, pp. 147–160; R. A. Houghton, 'Counting Terrestrial Sources and Sinks of Carbon', *Climatic Change* 48, 200, pp. 525-534; Y. Pan *et al.*, 'New Estimates of

Carbon Storage and Sequestration in China's Forests: Effects of Age-Class and Method on Inventory-Based Carbon Estimation', *Climatic Change* 67, Nos. 2-3, 2004, pp. 211-236.

54 Stephen J. Pyne, 'Fire Planet: The Politics and Culture of Combustion', Corner House Briefing, Sturminster Newton, UK, 1999, www.thecornerhouse.org.uk.

55 See http://www.fern.org/campaign_area.html?id=6.

56 L. Y. Pedroni and B. Locatelli, 'Contabilidad de créditos para carbono forestal: métodos e implicaciones. Análisis de Opciones del Mecanismo para un Desarrollo Limpio', submitted to the MINAE-OCIC Workshop, January 2002.

57 Quoted in Cathleen Fogel, 'Biotic Carbon Sequestration and the Kyoto Protocol: the Construction of Global Knowledge by the Intergovernmental Panel on Climate Change', *International Environmental Agreements* 5, 2, 2005, pp. 191-210.

58 Larry Lohmann, 'Carbon Con? Group Charges "Intellectual Corruption" over Global Warming Proposal', *Multinational Monitor*, September 2000, p. 26.

59 Open email, 21 April 2005.

60 Gregg Marland *et al.*, 'Accounting for Sequestered Carbon: The Question of Permanence', *Environmental Science and Policy* 4, 2001, pp. 259-268; Michael Dutschke, 'Fractions of Permanence – Squaring the Cycle of Sink Carbon Accounting', *Mitigation and Adaptation Strategies for Global Change* 7, 2002, pp. 381-402.

61 See http://www.rainforestcredits.org.

62 China, Korea, Chile, Mexico, Viet Nam and Argentina are also prominent. See http://www.cdm.unfccc.int for up-to-date figures on CDM projects.

63 'Doubts Raised over Some Indian CDM Projects', *Point Carbon*, 10 January 2006. Tracking CDM projects in India is extremely difficult. Though India has set up a National CDM Authority (NCDMA), with a dedicated website, and NGOs such as the Tata Energy Research Institute (TERI) and Germany's Gesellschaft fur Technische Zusammenarbeit (GTZ) offer India-specific data, information on CDM projects remains partial and inadequate. It is difficult to determine which project is selling what amount of credits to whom, and to find other relevant market information. Even the number of projects in the pipeline is difficult to ascertain. Validators' websites and the UNFCCC's list of projects being validated reveal names of CDM projects in India that are not on the NCDMA list. The fact that CDM projects in India do not require environmental impact assessments or management plans makes them all the more difficult to monitor and assess. Most surveys of CDM in India are carried out by supporters such as the NCDMA, the Asian Development Bank, and NGOs such as TERI, GTZ, or Japan's Institute for Global Environmental Strategies, and as a rule do not go beyond explaining business opportunities afforded by the CDM. There is little journalistic coverage of the physical performance of CDM projects and how they affect communities, and no systematic critique.

64 Anna Pinto, Centre for Organisation, Research and Education, 'Carbon Sinks, Carbon Trade, CDM and the Indigenous Peoples of the Northeast Region of India', draft, Guwahati, 2006.

65 Institute for Global Environmental Strategies; Ministry of the Environment, Japan; and Winrock International, India, *CDM Country Guide for India,* Second Edition, Tokyo, 2005, p. 43.

66 Soumitra Ghosh and Hadida Yasmin, 'Trade in Climate: The Saga of CDM, India Style', draft paper, Siliguri, 2006. This paper is part of a forthcoming *Report on CDM Projects* in India by Soumitra Ghosh, Devjeet Nandi, Nabo Dutta, Hadida Yasmin and Arindam Das.

67 Ritu Gupta, Shams Kazi, and Julian Cheatle, 'Carbon Rush', *Down to Earth*, Centre for Science and Environment, 15 November 2005.

68 *Ibid.*

69 *Ibid.*

70 Natuur en Milieu, 'The Future of the Clean Development Mechanism', Proceedings of the Renewable Solutions Conference, Montreal, 1-2 December 2005; see http://www.natuurenmilieu.nl/page.php?pageID=76&itemID=1596&themaID=7.

71 *Ibid.*

72 Gupta *et al.*, *supra* note 67.

73 Information on the sponge iron industry and CDM in this and succeeding paragraphs is drawn from Ghosh *et al.*, *Report on CDM Projects*, forthcoming (see *supra* note 66).

74 Minister for Forests and Environment Ganishram Bhagat, response to a question raised by MLA Nobel Verma in the Vidhan Sabha, 2 March 2005.

75 In a written reply to a question from MLA Dharamjit Singh, the State Minister for Forests, Environment and Housing informed the Vidhan Sabha on 24 February 2006 that in the Dharsinva Block of Raipur district, crops in 4,611 hectares of land belonging to the farmers of 17 villages had been severely damaged due to pollution spread by sponge iron plants. Crops have also been damaged in Kesla, Bodri, Chakarbhata, Dagori and Silphari villages of Bilha Block in Bilaspur district.

76 General Manager, District Trade and Industry Centre, Raigarh, 2005.

77 Gupta *et al.*, *op. cit. supra* note 67.

78 Ghosh *et al.*, *Report on CDM Projects*, *op. cit. supra* note 66.

79 Two researchers using software developed at the World Resources Institute in Washington estimated that as much as a staggering 7 billion tonnes worth of carbon credits could be sequestered by Indian plantations between 2000 and 2050 (Suruchai Bhadwal and Roma Singh, 'Carbon Sequestration Estimates for Forestry Options under Different Land Use Scenarios in India', *Current Science* 83, 11, 2002, pp. 1380-1386, http://www.ias.ac.in/currsci/dec102002/1380.pdf, p. 1380). A Planning Commission document has projected a vastly lower figure of 5 million tonnes of carbon dioxide saved a year, netting India about USD 125 million during the Kyoto Protocol's first commitment period (Planning Commission of India, *National Action Plan for Operationalising Clean Development Mechanism in India*, New Delhi, 2003, http://planningcommission.nic.in/reports/genrep/fin_CDM.pdf, p. 97). The fact that these two figures differ by a factor of 28 reflects the delirium that characterises the theory of carbon plantation 'offsets' (see Chapter 3).

80 Since 1992, the Indian pulp and paper industry has been trying to lease 'degraded' state forests to establish private plantations in order to meet the growing demand for raw materials. In 1994, when the Indian government tried to pass a law making this transformation possible, it faced stiff resistance from not only community groups and NGOs, but also the Planning Commission, which set up an expert committee to look into the matter. The committee categorically refuted the industry claim that degraded lands do not support biodiversity and are not used by local communities. It went on to show that leasing out of forests to industries would prove to be both ecologically and socially harmful, and would be an injustice to communities, who use all forests for livelihood and other reasons, and that no forests in the country could be said to be 'absolutely degraded' (N. C. Saxena *et al.*, *Report on the Prospects of Making Degraded Forests Available to Private Entrepreneurs*, Planning Commission of India, New Delhi, 1999).

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82 See http://www.communityforestryinternational.org.

83 See, for example, Irshad A. Khan, 'Joint Forest Management: Most Significant Forest Sector Policy Reform of Twentieth Century', note, World Bank, New Delhi, 2003.

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88 Shramik Adivasi Sanghathan, 'Village Forest Protection Committees in Madhya Pradesh: An Update and Critical Evaluation', 2004, available from http://www.forestpeoples.org. See also N. Kumar, 'All is Not Green with JFM in India', *Forests, Trees and People*, No. 42, June 2000, pp. 46-50, and A. Roychaudhury, 'The Woods are Lovely...', *Down to Earth* 17, 1995, pp. 25-30.

89 'Report of the Joint Mission on Madhya Pradesh Forestry Project', May 1999; Samata, 'Impact of JFM in North Coastal Andhra Pradesh – A People's Perspective', Samata and CRY-Net, Hyderabad, 2000; and M. Sarin *et al.*, 'Devolution as a Threat to Democratic Decision-making in Forestry? Findings from Three States in India (Orissa, Madhya Pradesh, Uttarakhand)', Overseas Development Institute, Working Paper No. 197, ODI, London, 2003, pp. 33, 35, 49-50, 56, 57, 61.

90 G. Brahmane *et al*, *op. cit. supra* note 87.

91 Inhabitants of so-called forest villages lack land title deeds (*pattas*) and are classified as 'encroachers' on state forest land.

92 For further information on the current situation regarding JFM in Madhya Pradesh, see Shramik Adivasi Sanghathan, *op. cit. supra* note 88.

93 K. Sivaramakrishnan, *op. cit. supra* note 85.

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96 Marrakesh Accords and the Marrakesh Declaration, Bonn, 2001, http://unfccc.int/cop7/accords_draft.pdf, Annex (A) 1. (c).

97 For example, Global Environment Fund, 'Conservation of Transboundary Biodiversity in the Minkébé-Odzala-Dja Inter-zone in Gabon, Congo, and Cameroon: Project Brief', World Bank, Washington, 2004, http://www.gefonline.org/projectDetails.cfm?projID=1095.

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99 'Doubts Raised over Some Indian CDM Projects', *Point Carbon, op. cit.*, *supra* note 63.

100 This is an example of a non-CDM carbon trading project. The project bypassed government and the CDM Executive Board and was implemented between two private entities. It was thus not subject to any legal requirements involving registration, monitoring or verification.

101 'Consulting Firms Deny Wrongdoing in Drafting Indian PDDs', *Point Carbon*, 11 November 2005, http://www.pointcarbon.com.

102 Ghosh *et al.*, *Report on CDM Projects*, *supra* note 66.

103 US Environmental Protection Agency, *Inside the Greenhouse*, EPA, Washington, 1997, www.epa.gov/globalwarming/greenhouse/greenhouse2/oregon.html. Solar-home systems are purchased on credit. SELCO was to use money from Klamath Falls to purchase stock. It would then be reimbursed by estate management using deductions from project participants' monthly salaries.

104 SELCO, a Maryland-based firm with offices in Bangalore, Colombo and Ho Chi Minh City, was established in 1997. Its Sri Lankan branch folded in 2005.

105 Solar-industry analysts believe that the Sri Lankan market for solar-home systems is at least one million households, not including the war-torn provinces of the north and east. (Personal communication, Mr Pradeep Jayawardene, Shell Renewables Lanka Ltd. At the time of an interview with Cynthia Caron, this number did not include the war-torn provinces in the north and east where ethnic conflict has created economic instability and uncertainty for Sri Lanka's business community. With the 2002 ceasefire agreement between the Government of Sri Lanka and the Liberation Tigers of Tamil Eelam (LTTE), the solar market might open up in the LTTE-dominated provinces in the island's north and east.) As of August 2002, about 30,000 systems had been installed island-wide, 20,000 with support from the World Bank's Energy Services Delivery Project. (Lalith Gunaratne, email correspondence 12 August 2002.) For more on the difficulties of financing solar-home systems for rural electrification, see Cynthia Caron, 'Examining Alternatives: The Energy Services Delivery Project in Sri Lanka', *Energy for Sustainable Development* 6, 1, 2002, pp. 37-45.

106 SELCO, 'Developing Countries Receive Solar Funding from Oregon's Klamath Cogeneration Project Carbon Offset Portfolio.' SELCO Press Release No. 4, 13 September 1999. Each lamp emits about 0.10355 tons of carbon dioxide per year.

107 J. T. Roberts and P. E. Grimes, 'World System Theory and the Environment: Toward a New Synthesis', in R. E. Dunlap *et al.* (eds), *Sociological Theory and the Environment: Classical Foundations, Contemporary Insights*, Rowman and Littlefield, Lanham, 2002, p. 184.

108 Due to the country's ethnic conflict, areas of the north and east also have large off-grid populations (80-100 per cent). Either the grid has been destroyed or the affected areas are under rebel control. In 1999-2000, the government and the private sector were unable to undertake infrastructure development activities in this region.

109 At the same time (1999), the country's overall literacy rate was close to 92 per cent. Estate education is understaffed. In 1999, the national teacher-student ratio was 1:22, while in the plantation sector it was 1:45.

110 From a study conducted by the Plantation Housing and Social Welfare Trust.

111 A. W. Little, *Labouring to Learn: Towards a Political Economy of Plantations, People, and Education in Sri Lanka*, St. Martin's Press, New York, 1999.

112 Some families already used a car battery to power television sets.

113 Personal interview with Cynthia Caron, 18 August 2000.

114 Five days at Rs. 122.15 (USD 1.58), or USD 7.90.

115 There were three cadres of employment on the estate: resident-permanent (from the estate lines), non-resident permanent (from nearby villages), and temporary-casual.

116 Many workers already had loans to upgrade their existing housing. Estate management took monthly deductions from the wages of workers who had housing loans administered by the Plantation Housing and Social Welfare Trust (PHSWT). Under the PHSWT housing-loan scheme, 'at least one family member of each family will be required to work on the plantation during the 15-year lease period', according to the trust itself. The only source of funding available to workers to improve their living conditions has been through loans that keep them tied to the unfair labour practices and dismal living conditions of estate life.

117 Figures are from the Plantation Housing and Social Welfare Trust.

118 While there are no studies that show a direct correlation between concentrations of off-grid technologies such as solar power and decisions not to extend the grid into those areas (Lalith Gunaratne, email communication with Cynthia Caron, 12 August 2002), the fear that off-grid electrification could keep an entire area permanently off-grid was very real for adjacent residents. Solar-home systems generate between 35 and 50 watts of power, enough to meet requirements for domestic lighting and electronic entertainment such as TV and radio. The relative low generation capacity of solar home systems does not appear to enable equitable opportunities for economic development in off-grid areas.

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121 Paul Faeth *et al.*, *op. cit. supra* note 2.

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