

Driving Destruction in the Amazon

How steel production is throwing
the forest into the furnace

Updated Edition
February 2013

GREENPEACE

1. Introduction	03
2. From forest to charcoal	05
3. Devastating development in the north-eastern Amazon	11
4. Amazon destruction in your garage	19
5. Moving forward: proceed with caution!	23
6. Conclusion and demands	27
Endnotes	28

For more information contact:
pressdesk.int@greenpeace.org

Written by:
Greenpeace International

Front cover image
© Rodrigo Baléia / Greenpeace

JN443

Second Edition
Published December 2012 by
Greenpeace International
Ottho Heldringstraat 5
1066 AZ Amsterdam
The Netherlands
Tel: +31 20 7182000
greenpeace.org

#1

Introduction

Wood charcoal is burning up more than what's for dinner at backyard barbecues. In Brazil – the world's largest consumer of wood charcoal¹ – turning iron ore dirt into steel requires massive amounts of energy, and for the rainforest in the northeastern Amazon this energy has come at a heavy price. Wood charcoal made from the charred remnants of the rainforest is used to heat pig iron blast furnaces that provide raw material for the steel mills and cast iron foundries. Steel is found everywhere – in cars, appliances, construction, and airplanes.

Two years of Greenpeace investigations, summarised in this report, reveal that end users – including major global car manufacturers – indirectly or directly source pig iron whose production is fuelled by forest destruction and slave labour in their supply chains. On notice for many years due to media and industry articles, these companies continue to disregard evidence that some of their suppliers are breaking Brazilian labour and environmental laws, and wreaking havoc in the Amazon.

Few places in the Amazon have experienced as much forest destruction as the Carajás region (made up of portions of Pará, Maranhão and Tocantins states). Like other sites of rainforest devastation in Brazil, most of the denuded land is today occupied by soy farms and cattle pastures. What makes this region different, however, is the fact that logging and charcoal production have served as principal drivers of forest loss in the region.² Over the years, thousands of remote charcoal camps, spread throughout the region have pillaged huge areas of natural rainforest to smoulder into wood charcoal to fuel the blast furnaces of the region's production of pig iron, a primary ingredient for steel.

The world's largest iron mine, under the control of Vale SA, the world's second largest mining company³, is centrally located in the region. Since the late 1980s, this iron ore deposit has attracted the development of 43 pig iron blast furnaces operated by 18 companies.⁴ These blast furnaces - fuelled by charcoal - use substantial amounts of raw iron ore from this mine that is processed into pig iron. The Brazilian government has invested heavily in the region's pig iron, mining sector and infrastructure through the Programa Grande Carajás ("The Great Carajas Programme"). Financing for this project came mostly from the World Bank, the European Economic Community (predecessor to the European Union) and the Japanese government.⁵ The pig iron industry and its charcoal suppliers have brought severe negative impacts to the region. Aside from intense forest destruction, the charcoal industry has a notorious track record for slave labour. Furthermore, the rush to seize the forest for both timber and charcoal has fuelled violence and land conflicts.

Almost all of the pig iron connected to the region's devastation is exported to the US and used as a primary ingredient for making steel or cast iron. Despite attention to the problem over the years, little has been done and household consumer products in the US can still be traced back to illegalities and forest destruction in the Amazon. Addressing these problems will require action on behalf of both the Brazilian government and the American steel and cast iron industries and their major consumers, such as Ford, General Motors, BMW, Mercedes, Nissan, and John Deere.



#2

From forest to charcoal

Like something out of a film from a time long past, dozens of smoky charcoal camps are spread throughout remote areas in the northeastern Amazon. These camps smoulder rainforest into charcoal, which is then burnt to make pig iron in industrial blast furnaces. Forest is cut and loaded into dozens of 2.5 metre-high beehive-like ovens in these charcoal camps. Often illegal, these camps are built in a matter of days, located in difficult to access areas and, if shut down by authorities, frequently spring up again in another location. They are built next to wood sources, including illegally in protected areas and indigenous lands.⁶

Workers, often living in the camps and at times working in conditions akin to slavery, stack the ovens with wood and set it alight to smoulder into charcoal for up to seven days.⁷ The charcoal is then trucked to the region's 43 blast furnaces to act as fuel to convert raw iron ore into pig iron.⁸ Pig iron is a key ingredient in the production of steel and cast iron.

Although mostly associated with barbecues, the vast majority of charcoal goes into this energy intensive process. The Brazilian government's 2007 National Plan on Climate Change officially recognises pig iron as a driver of greenhouse gas emissions from deforestation.⁹

Fuelling pig iron production with charcoal

According to IPIA, the cost of the fuel makes up 35% of the cost of the pig iron depending on the market price¹⁰, and the pig iron blast furnaces draw upon the cheapest fuel possible. Charcoal camps in the region often rely on labour conditions akin to slavery or illegal wood to lower expenses and increase profit.¹¹ Illegal wood provides an incredibly lucrative opportunity for charcoal makers because illegal material has been estimated to cost roughly one-tenth of plantation-grown timber.¹²

Slavery - cruel cost-saving measures for the wood charcoal sector

Working conditions akin to slave labour are endemic in the region's charcoal camps. Far from secret, the plague of rural slavery in the region has been the subject of reports by the UN and the International Labour Organisation^{13,14} and the US Department of Labour has recognised Brazilian charcoal in its "List of Goods Produced by Child Labour or Forced Labour".¹⁵ According to the Brazilian Ministry of Labour, wood charcoal production and related forest degradation is one of the leading sources of slavery cases in Brazil.¹⁶ According to Repórter Brasil, a NGO specialised in contemporary slavery, 2,700 workers were liberated from slave-like conditions in charcoal camps in Brazil between 2003 and 2011.¹⁷ In 2010, Pará was the Brazilian state with the largest number of slavery cases, while Maranhão was the seventh.¹⁸

The typical forced labour case resembles a type of debt bondage where a recruiter, referred to as a "Gato", visits rural towns and offers distant work opportunities to the men in the town. The men are brought to a remote camp and informed that they owe an exorbitant amount of debt for the costs of the trip and are forced, many times with violent threats, to stay and work off their invented debts. Besides low pay, charcoal camps often cut corners by providing unsanitary living conditions and little food. Workers are subjected to dangerous working conditions and often have to remove charcoal from ovens at high temperatures without protective gear.¹⁹



At the charcoal camp I cut logs, fill the oven with wood, and remove the charcoal. Manuel, the person in charge, took me by bus to the charcoal camp which was a 5 km walk from the side of the road where the bus stopped. At the charcoal camp, I did a bit of everything... I got paid 15 Reais (8 USD) to fill an oven with wood, 8 Reais (4 USD) to remove the charcoal, I would get paid 7 Reais (4 USD) to cut enough wood to fill an oven. With these three jobs I only made 300 Reais (164 USD) per month... I lived in a wood tent, covered in black plastic sheet, with bare ground and no plumbing, no sinks or toilets. The little water that did come from another property and the charcoal camp put the water in plastic drum that once held diesel oil. This plastic drum sits on the ground, exposed to the elements. I arranged with the owner to go to [a nearby city] every 30 days but [I] would have to pay. Until then I hadn't returned home, I still hadn't received any salary. I worked every day, including Sunday when the weekly production was too small.²⁰



In addition to low wages or forced labour, work conditions at the charcoal ovens are hazardous to worker health. To remove the charcoal workers have to enter the ovens, which have very little ventilation. In the process, workers are exposed to dust, smoke and high temperatures.²¹ Long-term exposure to the dust and smoke is extremely hazardous for the workers. A peer-reviewed study published in *Occupational & Environmental Medicine* found that with this method of charcoal production, many chemicals in the smoke and dust from these charcoal ovens "are irritant and [cancer-causing], such as nitrogen and sulphur oxides, benzene, methanol, and styrene, phenols, naphthalene, aldehydes, organic acids, and polycyclic aromatic hydrocarbons".²² Studies on health effects of exposure to wood smoke in environmental and occupational settings have shown increased prevalence of respiratory symptoms and diseases due to the effect of wood smoke on respiratory function.²³ Workers do not receive adequate training or safety gear to minimise these health impacts.²⁴

The Pig Iron supply chain

From habitat to car parts and steel

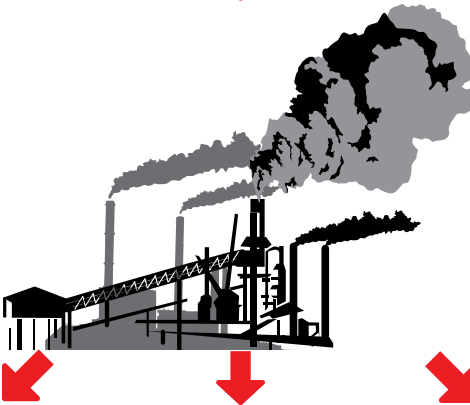
This diagram represents a typical supply chain for steel or cast iron products but by no means represents all of the pathways from pig iron into final products. Sometimes there are additional or fewer intermediaries, and sometimes manufacturers buy the pig iron directly and use within their own facilities.



Trees are cut and the entire tree goes to charcoal camps or is processed first in a **sawmill**. The sawmill waste wood, which can be two thirds of the tree, gets smouldered for charcoal at remote **charcoal camps**.



Often, these camps are clandestine, operating without licence inside **protected and community lands**, or on **indigenous land**. Workers are often living in slave-like conditions.



Almost all of the region's **charcoal** is bought by pig iron companies such as *Sidepar* or *Viena*. These companies use the charcoal to fuel the processing of **iron ore** into **pig iron**, a key ingredient in **steel**.



Pig iron is imported by Cargill's Ferrous division, one of the world's largest mineral traders.



Steel mills buy the pig iron to mix with scrap metal to make steel.



Mineral brokers import pig iron from the Amazon. Broker *National Material Trading* sells its pig iron to cast iron foundries operated by *John Deere*.



Automakers and construction companies are the major consumers of steel, together using around 66% of the steel in the US. There are many ways for steel to enter an automaker's supply chain, including as rolled sheet steel or cast iron parts.



Cheap wood fuel, deeply discounted through forest destruction

Pig iron's insatiable appetite for the hard stuff

To make pig iron requires an enormous amount of wood charcoal and consequentially wood. The production of 1 ton of pig iron requires the burning of 2.2 metres of charcoal.²⁵ This volume of charcoal requires 4.4 cubic metres of wood – twice the volume – from the Amazon Biome.²⁶ The most recent annual peak production of the north-eastern Amazon's pig iron, in 2007, yielded 3.59m metric tons of pig iron.²⁷ Applying the same ratio, the region's production of that year required approximately 15.8m cubic metres of tropical wood.^{28,29} A third of the wood going into the charcoal ovens was estimated to come from illegal wood sources according to a 2006 academic study.³⁰

It is difficult to calculate just how big of a price the Amazon has already paid for the pig iron industry. Unlike other drivers of forest destruction, such as cattle or soy, it is difficult to measure the amount of pig iron deforestation based on present land use – all of the wood that is used for charcoal is burned, and the forest is often replaced by pasture or soy plantations.

If the wood used was compared to an area of deforestation the scale would be impressively large. A recent report by the Brazilian environmental protection agency, Ibama, calculated the wood charcoal consumption of one medium-sized pig iron company, Siderúrgica do Pará (Sidepar), was responsible, over the last 5 years, for the equivalent of at least 37,000 hectares of illegal deforestation, or 142 square miles.³¹ This example only looks at two of the region's 43 pig iron blast furnaces.³²

The origin of the wood is difficult to pinpoint. The sources of wood are becoming more diverse over time and the supply chain for wood for the charcoal ovens is complex. The wood for charcoal in the region traditionally came directly from illegal logging or waste from sawmills, but in recent years more charcoal camps have begun – in small numbers – to source alternatives such as plantation timber or coconut shells.³³

However, native forest and “sawmill waste” together still dwarf these alternatives as the primary supply for wood charcoal today.³⁴ Charcoal camps still rely on illegal wood for a sizeable portion of their wood source as it is cheaper.³⁵

Timber sources for charcoal ovens:

- **Wood that is legal** – includes any source with an approved permit, such as plantation-grown timber, native forest logging with government permits, and legal sawmill waste.
- **Illegal wood** – includes illegally-cut wood from protected conservation areas and reserves, indigenous lands, wood without permit or forest management credits.
- **Hidden in waste wood credits** – State governments award sawmills with inflated amount of credits for “legal wood waste”. For every cubic metre of sawn timber from the log, an additional cubic metre is awarded for the waste of the cut log at the sawmill.³⁶ This generous ratio allows sawmills ample space to hide illegal wood waste within the legal wood waste, which is then sold to charcoal camps.
- **Document fraud** – includes sawmill waste or other timber that is fraudulently presented as legal (see next section).

How charcoal producers and their clients cook the books

Greenpeace's investigation identified eight categories of frauds commonly occurring in the industry. These frauds were also confirmed by a variety of government reports and investigations.³⁷

1. **Operating without obtaining a licence** – Charcoal camps operate clandestinely. These operations are likely to be involved in illegal logging and deforestation, slavery, or invasions in indigenous lands.
2. **Operating with a suspended licence** – Charcoal camp licences are suspended due to unpaid fines, environmental or labour violations, but continue production. Because they are now operating illegally, they aren't on the radar of the government and are therefore not monitored for environmental or labour practices.
3. **Illegal transportation** – Illegal charcoal producers transport their product on trucks using the licence plate of another vehicle in order to avoid a possible link between the shipment and the illegal operation.
4. **False delivery entries** – when delivered to the pig iron company, a shipment of illegal or unlicensed charcoal is entered into the company's official record as a shipment connected with a licensed charcoal company.
5. **Using fraudulent forest management credit** – timber is classified as legal if it is accompanied with forest management credits. An approved forest management plan awards the property owner a certain amount of credit based on the expected yield of the timber harvest. With large amounts of illegal wood in the region, these credits have become a hot commodity and are often sold to "legitimise" illegal wood. For example, a property owner obtained forest management credits for his land, even though there were no forests on his property. He then used his credits to "legalise" illegal timber from another property.
6. **Phantom companies** – Pig iron producers buy from a licensed charcoal camp, but the camp only exists on paper and does not exist physically. That means the source of the timber is unknown.
7. **"Empresas fachadas" or business fronts** – licensed charcoal camps that sell charcoal they don't produce. These licensed camps purchase charcoal from unlicensed or illegal operations and sell the charcoal as their own. In this sense, the camp operates as a "charcoal broker" as well as a charcoal producer.
8. **Impossible balances** – Occurs when the output of the pig iron producer or charcoal camp does not match up physically with the amount of charcoal or wood that the operation puts in its company records.



#3

Devastating development in the north-eastern Amazon

Climate of fear and violence

Illicit logging activity and pressure on the forest have led to land disputes and violence. Forest-dependent peoples, who live in “extractive reserves” and rely on forest-friendly economic activities such as the extraction of rubber and Brazil nuts, have seen their reserves invaded by loggers who intimidate these forest communities with violence.³⁸

Community leaders like José (Zé) Cláudio Ribeiro da Silva and his wife Maria do Espírito Santo da Silva, known for bravely standing up to illegal loggers, have been murdered in the region, and other community leaders regularly receive death threats. Prior to his murder, Greenpeace interviewed Zé Claudio about the region’s deforestation connected to the pig iron industry. He told us that the invasions of loggers into their community coincided with high charcoal prices in 2007, when there was a charcoal shortage serious enough to be reported by steel industry journals in the US.³⁹

Zé Claudio’s home, the Praia Alta Piranha reserve, was established in 1997 and had 85% natural forest cover. Today, following years of invasions by illegal loggers, only 20% remains and much of it is fragmented.⁴⁰ Zé Claudio was very outspoken about the destruction of the reserve for timber and charcoal production, received repeated death threats and, tragically, predicted his own assassination during a lecture he gave at TEDx Amazon.⁴¹

“

I live by the forest and will do anything to protect it. For this I live knowing that I can be shot in the head at any given moment. Because I expose the loggers, I expose the charcoal makers, and for this they think that I shouldn’t exist.

The same thing they did in Acre [State] with Chico Mendes, they want to do to me, the same they did with Sister Dorothy, they want to do to me. I could be here today, speaking with you, but in a month you could hear news that I have disappeared.

”

– José Cláudio Ribeiro da Silva, TEDx Amazonia 2010

Rosina Diniz, from Conselho Indigenista Missionário do Maranhão, explains how the growth of the pig iron industry in the Awá-Guaja region and consequential pressure on the territory has impacted the traditional people there:

“

Everything began with the notice of the Great Carajas Programme in the region, from there began a rush to occupy the lands. With the grabbing of these areas, there began to appear cases of Awá groups being threatened and exterminated. In short time, they were being expelled from places where they always lived.

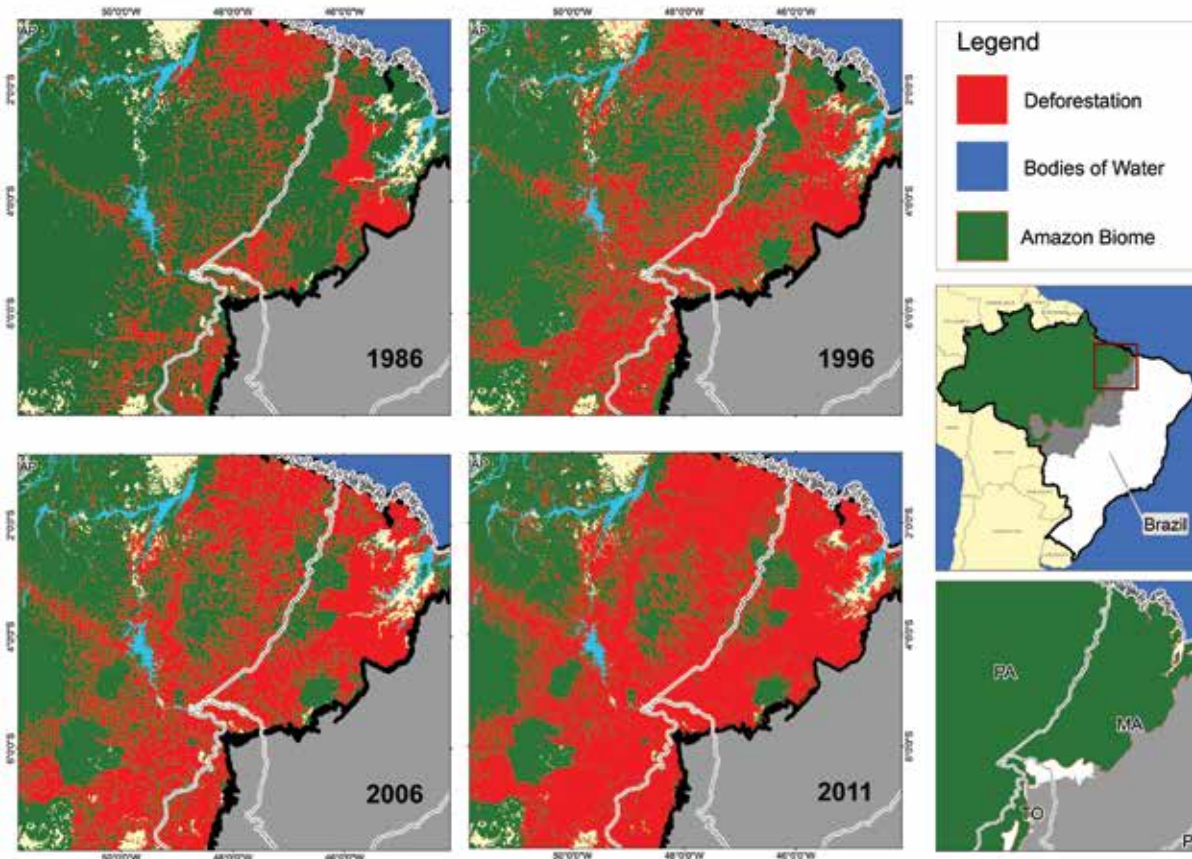
Even after the indigenous lands were recognised by the government, the pressure on these lands for the resources never stopped. Even today, the indigenous people continue to suffer the impact from the region’s pig iron production and the devastation of their territory continues. The Awá continue to be victims of the logging trade, which represents their largest threat. When you are in their villages you can hear the chainsaws at work. It’s not news that the wood that feeds the charcoal ovens comes from these indigenous lands.

”

Forest devastation in the north-eastern Amazon – an overview

These maps show the rapid destruction of the region's natural forests since 1986, shortly before the pig iron companies were established. This trend coincides with a steady expansion of pig iron production in Maranhão and Pará.⁴²

These maps illustrate how, in this region of the Amazon, few native forests are left standing except for fragments in protected areas or indigenous lands belonging to traditional forest people such as the Awá. With other sources of timber already gone, these forest fragments are under intense pressure from illegal loggers, charcoal camps and farmers. Unless action is taken, what forest is left in the region will soon be gone.

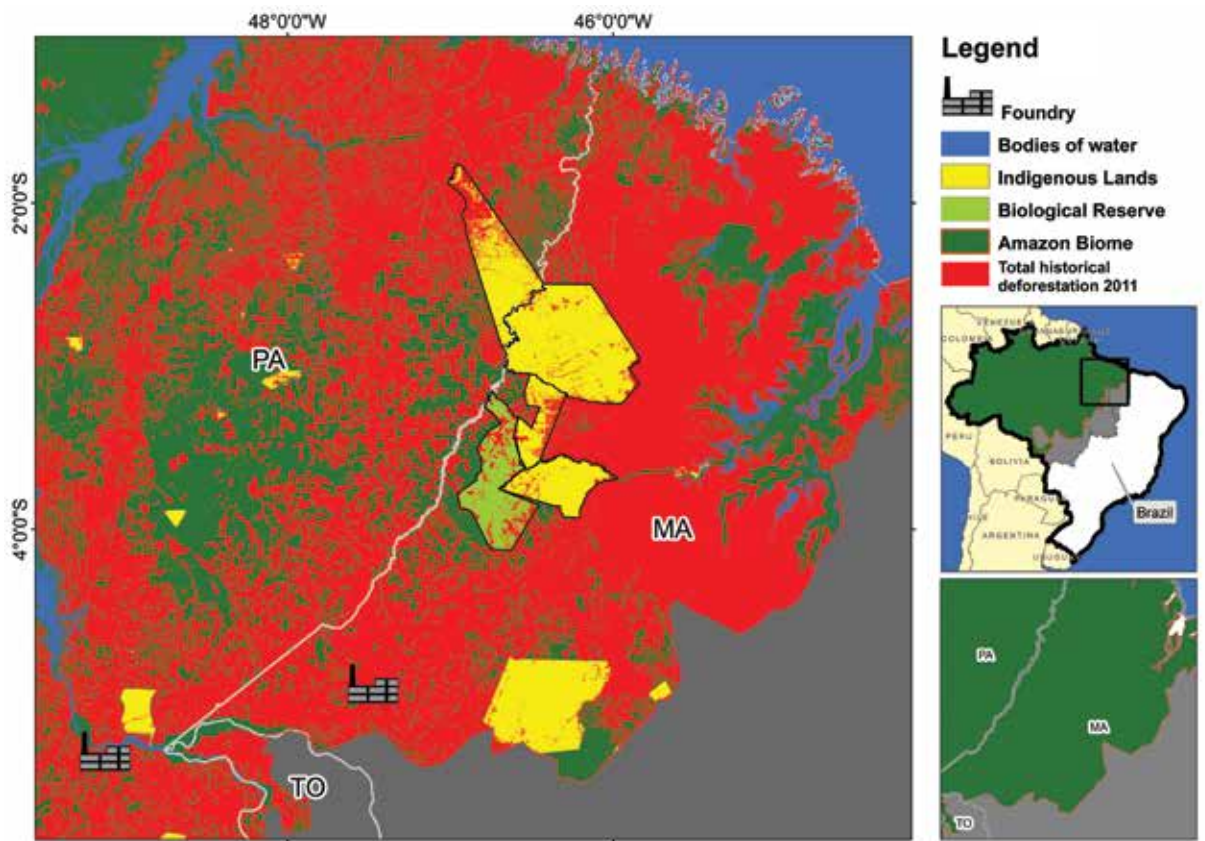


Source: Instituto Nacional de Pesquisas Espaciais (INPE).⁴³

Total deforestation of indigenous lands in Maranhão until 2011:

- Alto Rio Guamá has lost 282,500 hectares (31%) of forest cover.
- Alto Turiáçú has lost 529,200 hectares (7.1%) of forest cover.
- Awá has lost 116,500 hectares (31.5%) of forest cover.
- Carú has lost 179,200 hectares (9.5%) of forest cover.

Source: Instituto de Pesquisa Espaciais (INPE)⁴⁴

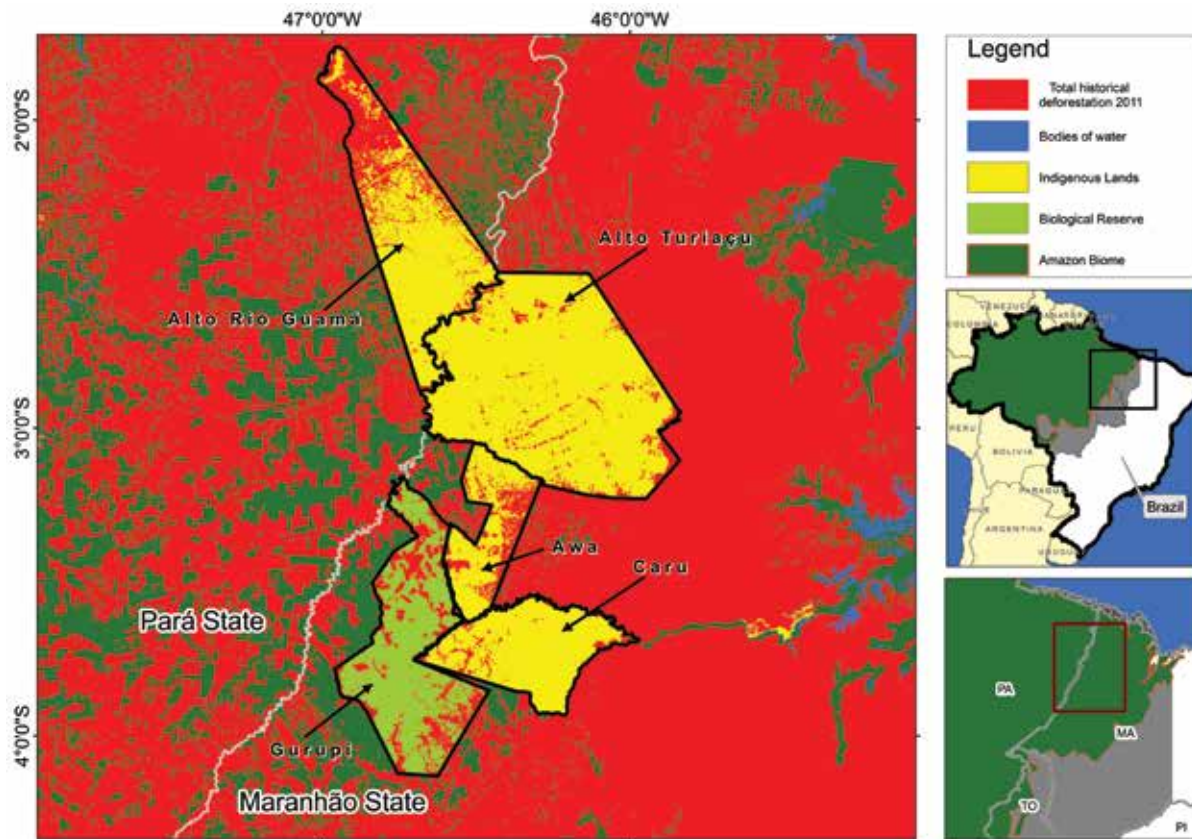


Source: Instituto Nacional de Pesquisas Espaciais (INPE).⁴⁵

Impact on protected lands: The threatened Gurupi “Mosaic”

With few forests left standing, illegal loggers and illegal settlers have targeted a mosaic of adjacent protected areas. These lands include the legally protected indigenous lands Awá, Alto Rio Guamá, Alto Turiacu and Carú, as well as the Gurupi Biological Reserve.

All of these protected areas have experienced extensive invasions from illegal loggers. Up until 2011, almost one-third of the Alto Rio Guamá and Awá territory has been destroyed by illegal logging and subsequent land use changes.⁴⁶ Here, loggers flagrantly violate the law and bring in multiple trucks for hauling away timber and often enter indigenous lands well armed.⁴⁷



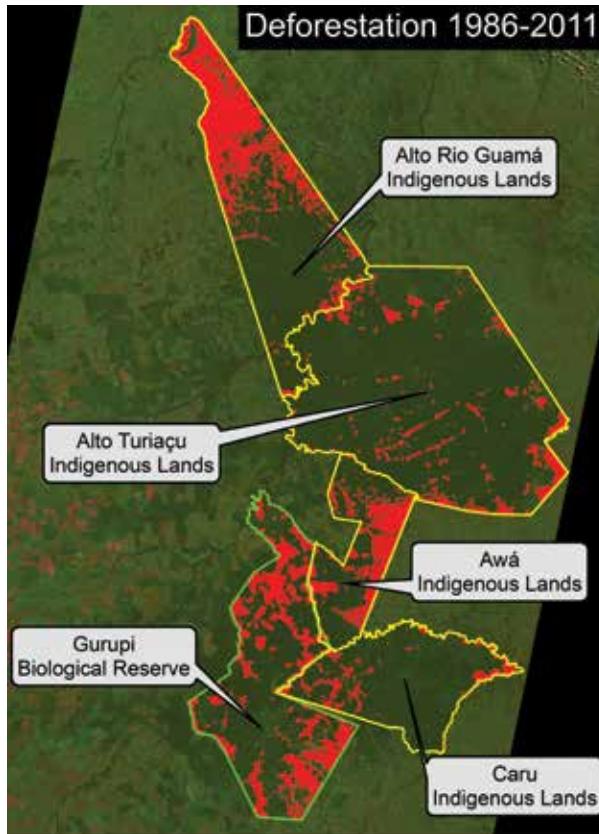
Source: Instituto Nacional de Pesquisas Espaciais (INPE).⁴⁸



Due to the acceleration of invasions, if there is no quick or emergency action, the future of this people is extinction.



Assessment of Bruno Fragoso, coordinator of the Brazilian government's National Indian Foundation's section for isolated and recently contacted indigenous people.⁴⁹



Source: Instituto Nacional de Pesquisas Espaciais (INPE).⁵⁰

Threatened biodiversity in the protected areas

The mosaic of the Alto Rio Guamá, Alto Turiacu, Awá and Caru indigenous lands and the Gurupi Biological Reserve represents habitat for **158 species of mammals, 63 species of amphibians, 11 species of reptiles, and 10 species of birds** that appear on the IUCN's Red List of Threatened Species.⁵¹



©GREENPEACE / JOHN MOVIS

The region's deforestation has also impacted the viability of the jaguar in the wild. The jaguar is a species of concern under the IUCN, but the population is spiralling downwards towards becoming endangered. Loss of habitat and forest fragmentation is driving this trend. The jaguar is also seen as a threat to livestock by cattle ranchers, and is therefore often shot.⁵²

**Indigenous groups in crisis:
The case of the Awá-Guajá**

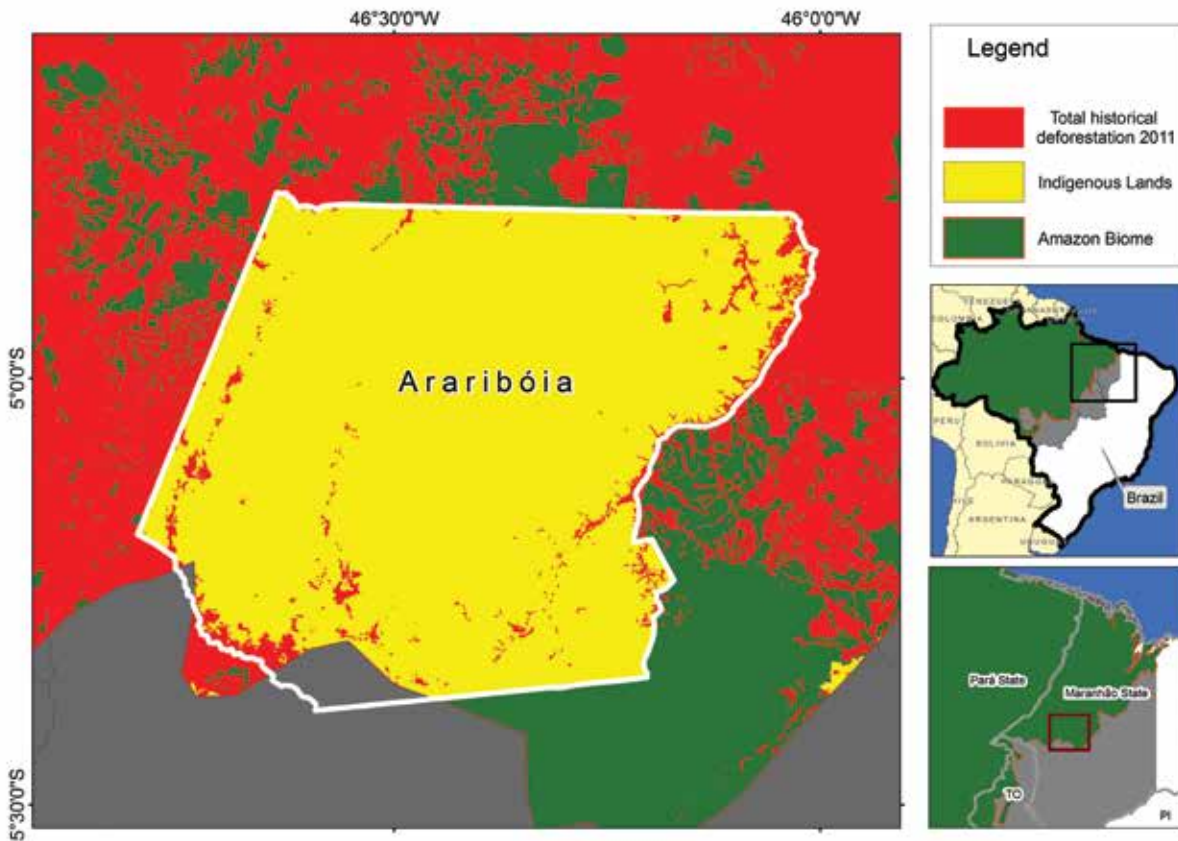
The Awá-Guajá is a population, comprised of between 350 and 400 individuals⁵³, and the group is one of the nomadic hunter-gatherer groups in Brazil that knowingly live in voluntary isolation.⁵⁴ The Awá-Guajá population is distributed between the indigenous lands Awá, Alto Turiaçú, and Carú, within the Gurupi 'Mosaic,' in addition to the Araribóia Indigenous Lands to the south in Maranhão State.^{55,56} The history of contact with the Awá is very recent, dating back only about 40 years.⁵⁷ As hunter-gatherers, the Awá-Guajá are completely reliant on the forest for survival.

The Awá-Guajá's survival is under threat from ranchers and loggers.⁵⁸ Up to 30% of the forest that the Awá-Guajá rely on has been degraded.⁵⁹

Not only has this devastation impacted the ability of the Awá-Guajá to hunt for food, but the invasions into the Awá-Guajá territory have led to violence.⁶⁰ Just this year, a Brazilian NGO specialising in indigenous peoples' matters reported incidents of loggers running over Awá-Guajá living quarters with tractors, and loggers possibly murdering an Awá-Guajá child.⁶¹

The NGO Survival International has also recently reported another case of violence against the Awá: loggers attacked, tied up, blindfolded, and then attempted to decapitate an Awá man, and fired their guns at the man's wife when she ran for help.⁶²

The Awá territory in the indigenous lands of Araribóia is nearby a logging centre, the town of Buriticupu. In 2009, this town was home to 35 sawmills. An Ibama investigation found only two of these mills had legal operating licences. Ibama shut the mills down, but as soon as federal authorities left, the sawmills returned to normal operation.⁶³



Source: Instituto Nacional de Pesquisas Espaciais (INPE).⁶⁴

The Gurupi Biological Reserve

Surrounded by devastation, the Gurupi Biological Reserve is one of the last intact forest landscapes in the region. In an area almost completely deforested, this reserve is one of the most biodiverse areas in the region, but also one of the most threatened. The reserve is one of the few places where critically endangered primates such as the black bearded saki (*Chiropotes satanas*) and Ka'apor capuchin monkey (*Cebus kaapor*), as well as endangered birds such as the golden parakeet (*Guaruba guarouba*) and hyacinth macaw (*Anodorhynchus hyacinthinus*) can be found. The reserve is also home to threatened species like the jaguar (*Panthera onca*).^{65,66,67}

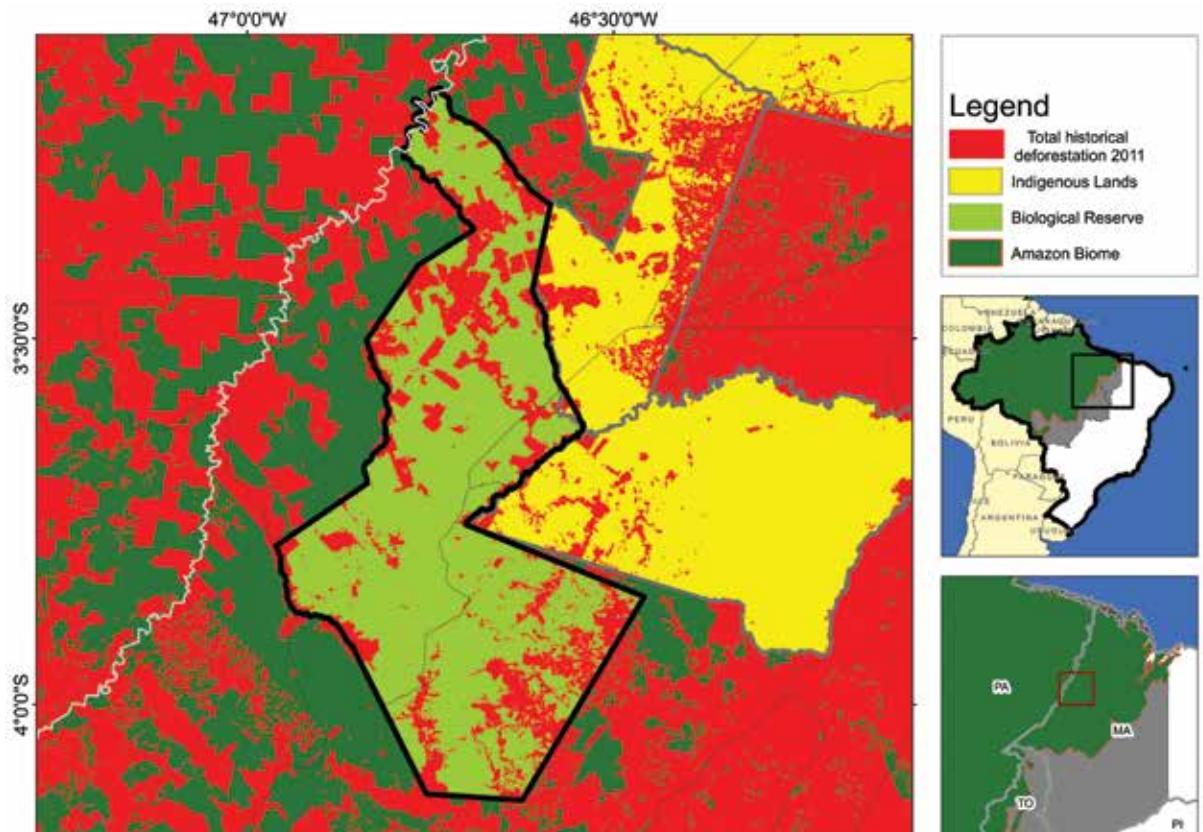
The 341,000 hectare Gurupi reserve, roughly three times the size of Los Angeles, was established in 1988 around the same time that the pig iron companies began production.⁶⁸ Until 2011, around 28% of the area had already been deforested.⁶⁹



In recent years there have been high levels of extraction of high end lumber, but there is a growing demand for charcoal wood, representing an intense and constant pressure over the reserve and three neighboring indigenous lands.



- Amazônia Maranhense – Diversidade e Conservação⁷⁰



Source: Instituto Nacional de Pesquisas Espaciais (INPE).⁷¹



#4

Amazon destruction in your garage

How US car manufacturing is contributing to the devastation in the Amazon

Charcoal production with widespread illegalities and social and environmental consequences is fuelling the production of pig iron exported, by and large, to steel mills and cast iron foundries in the US. Over the last few years, 80-90% of the region's pig iron that was exported went to the US.⁷² Greenpeace's investigation found that a Columbus, Mississippi steel mill, operated by Russian steel giant Severstal, imports pig iron from Brazilian producers Viena and Sidepar⁷³. This mill produces steel for major automakers such as Ford, General Motors, BMW, Mercedes and Nissan.⁷⁴

Greenpeace's research found Viena and Sidepar fuelling their foundries with illegal charcoal connected to the region's pandemic illegalities including slavery, illegal logging and deforestation, and invasions into indigenous lands.

Metal brokers such as the Ferrous Division of Minnesota-based **Cargill**, Illinois-based **National Material Trading**, and Pennsylvania-based **Environmental Materials Corporation** also import pig iron from Viena.⁷⁵ National Material Trading supplies pig iron to clients like Waupuca Iron Foundry⁷⁶ in addition to an Iowa iron foundry operated by **John Deere**⁷⁷, the world's largest producer of construction, forestry and agricultural equipment.⁷⁸

Car companies and others wash their hands of responsibility

The illicit activities surrounding pig iron's production, forest destruction and slavery, and their connection to US auto manufacturing, were largely exposed in the US in a 2006 *Bloomberg Markets* story on steel.⁷⁹ Although there was an immediate reaction from companies like Ford, who cut business ties for a short period with the pig iron companies in Brazil⁸⁰, over five years later very little has actually been done to address the problem. Some companies, such as Ford and General Motors, have spoken about the issue of slavery to the press as recently as 2011.⁸¹ Some companies have vague policies aiming to address slavery, but with no functional mechanisms to monitor progress. No companies have publically presented efforts to combat illegalities related to forest loss in their supply chains.

How automakers' tainted pig iron suppliers throw forests into the furnace



Pig iron producer Viena (Maranhão State), the largest and oldest operation in the region is an example of the impunity rife in the industry.

The region's largest and oldest pig iron operation is **Viena Siderúrgica do Maranhão (Viena)**.⁸² The company, based in Açailândia, Maranhão, controls five blast furnaces and is affiliated with two other large pig iron companies, **Compania Vale do Pindare (Pindare)** and **Siderúrgica do Maranhão, (Simasa)**.⁸³ The three companies have an annual production capacity of 1.5m tons of pig iron, and Viena has at least 80% of its product going to the US.⁸⁴ Viena continues to do business with slavery and illegal businesses, and is connected to Amazon destruction.

Slave labour

One of Viena's major suppliers in Pará State, **Carvoaria Chapadão**, from whom Viena bought 197 shipments of charcoal in 2011⁸⁵, was cited for slave labour in December 2011.⁸⁶ At that time, according to a Brazilian NGO, investigators liberated 61 workers from the company's camp.⁸⁷ Before the raid, Carvoaria Chapadão's operating licence had already expired, but Viena still purchased at least 10 shipments of wood charcoal, totalling a volume of roughly 600 cubic metres.⁸⁸

Doing business with phantoms

Viena repeatedly bought directly from Pará state charcoal camps **FR Industrial e Comércio de Carvão** and **TV De Montreuil** at a time when neither company had a valid operating licence.⁸⁹ FR Industrial e Comércio de Carvão was also fined by Ibama for violating forest laws⁹⁰, and TV De Montreuil was also fined by Ibama for presenting false information concerning the transport of timber.⁹¹

In 2011, Viena also bought charcoal this past year from **Serraria Agropal** in the municipality of Dom Eliseu in Pará State.⁹² Even though Serraria Agropal had legal permits to sell charcoal, it was also buying a significant amount of illegal charcoal from charcoal camps **Carvoaria Tailândia Ltda** and **EJF de Lima**.⁹³ EJF de Lima is a "phantom" charcoal company that only exists on paper, so the charcoal sold by Serraria Agropal was from unknown sources.⁹⁴ Carvoaria Tailândia is a "front" company that sells legal charcoal transportation licences to illegal operators in order for them to legally truck their product.⁹⁵

By doing business with these two companies, Serraria Agropal was able to launder 11,700 cubic metres of illegal charcoal.⁹⁶ This amount could fill 234 trucks⁹⁷ and provides enough fuel to produce 5,318 tons of pig iron.⁹⁸ This single illegal charcoal example – in an industry rife with such impunity - used a quantity of wood equal to 335 hectares of Amazon rainforest, more than a square mile, as calculated by Ibama.⁹⁹

The scale of these illegal operations is limitless. Serraria Agropal also bought 65 trucks worth of charcoal from **RL Indústria e Comércio de Carvão LTDA**, another legal company who had used this paperwork to launder twice as much illegal charcoal.¹⁰⁰ RL Indústria e Comércio de Carvão LTDA was found to have bought 13 truck loads of charcoal from **Carvoaria Planalto**¹⁰¹, a phantom company.¹⁰² According to Ibama, Carvoaria Planalto laundries vast amounts of illegal charcoal in the region.¹⁰³ Carvoaria Planalto also sold at least 800 trucks of illegal charcoal to other intermediaries before arriving at Viena and others' foundries.¹⁰⁴

High-risk purchases from sources likely operating in indigenous lands

Three of Viena's charcoal sources are **J A R Marinho Ind e Comércio** and **Sebastião Sucupira Sobrinho Indústria** from the town of Amarante do Maranhão, and **J Resende da Silva** from Buriticupu.¹⁰⁵ J A R Marinho was found by Ibama to sell wood illegally.¹⁰⁶ Given that the only forests nearby these charcoal operations is Araribóia indigenous lands, one can conclude that this legally protected area – regularly invaded by illegal loggers – is the likely source of this illegal wood. Viena purchased almost 8000 cubic metres of charcoal from these three charcoal camps.¹⁰⁷

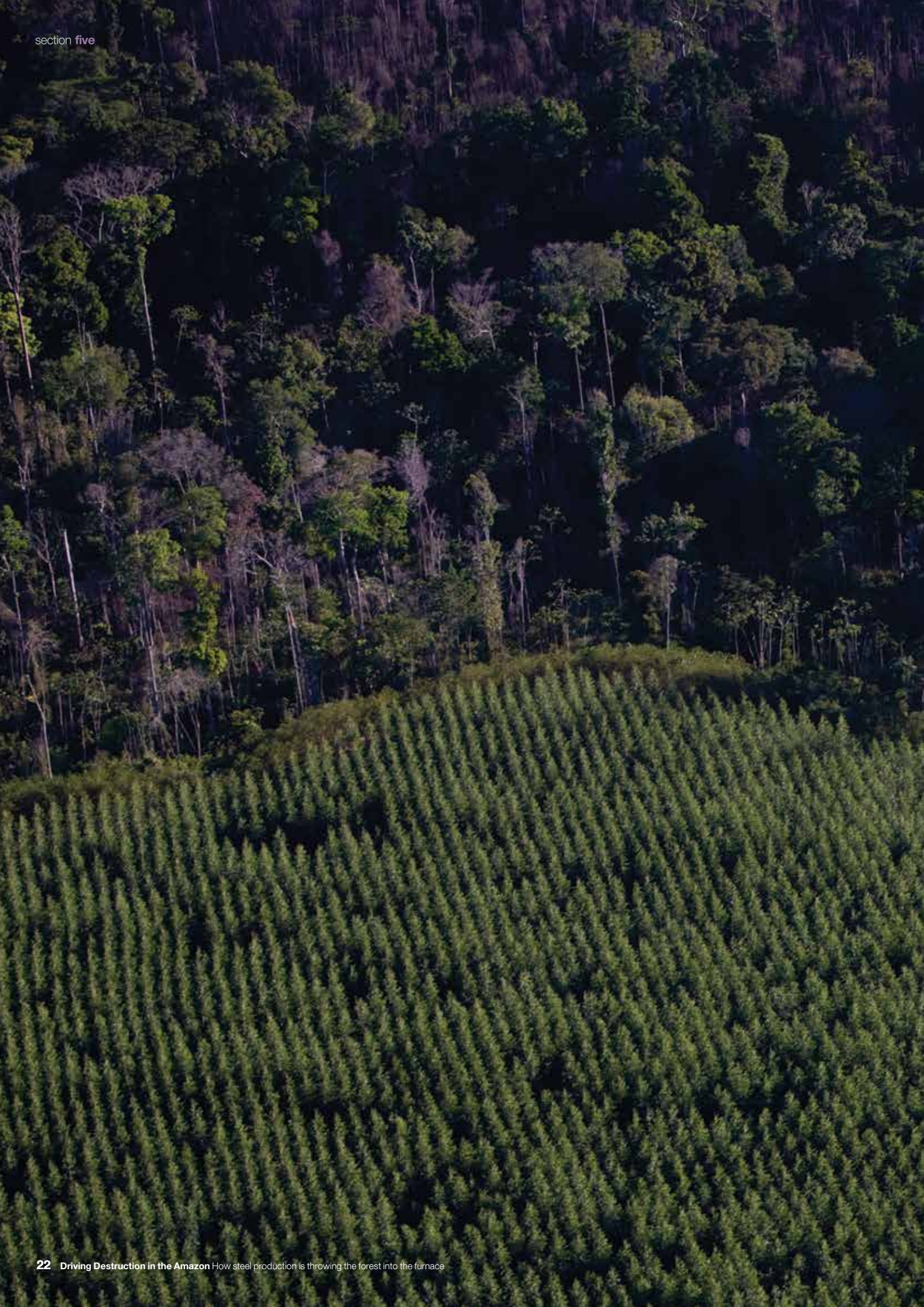


**Pig iron producer Sidepar (Pará State):
the subject of a major government investigation and a
player in the US market**

Siderúrgica do Pará (Sidepar), a medium-sized pig iron blast furnace in Pará State that also supplies the Severstal Columbus, Mississippi steel mill¹⁰⁸, not only purchased from the same charcoal camps mentioned for Viena¹⁰⁹, but also bought from other blatantly illegal sources. Sidepar considerably underrepresented the amount of charcoal it bought for its operations, and was unable to account for over 600,000 cubic metres of charcoal.¹¹⁰ Charcoal from some suppliers was falsified in the company's documents as originating from legitimate sources.¹¹¹

Ibama conducted a site visit to an alleged supplier of timber waste, called **Associação dos Agricultores Familiares do Projeto de Assentamento Rio Cururuí**. This group appears in many transactions done with charcoal camps that supply Sidepar.¹¹⁰ This supplier undertook an elaborate scam to hide its illegal wood. Cururuí obtained credits for a large forest management plan, and presented the timber waste that it sold as coming from that legal forest management plan.¹¹³ In reality, the forest was untouched, and the forestry credits were sold to charcoal camps so that these could legitimise wood from unknown sources.¹¹⁴ This scam was used to launder almost half a million cubic metres of timber.¹¹⁵

Sidepar, credited by Ibama for causing 37,000 hectares or 142 square miles of illegal deforestation in just four years¹¹⁶, avoided punishment for these crimes when it entered a plea bargain settlement with the Federal Public Prosecutor.¹¹⁷ Sidepar's competitors, pig iron producers Companhia Siderúrgica do Pará and Siderúrgica Ibérica, also signed the same settlement, admitting that they had actively bought from illegal sources over the past few years.^{118, 119}



#5

Moving forward: proceed with caution!

Plantations as the solution: a reason to proceed with caution

The pig iron industry in Brazil needs a radical overhaul. It will need to find a replacement for the native wood it uses for charcoal. Charcoal as a fuel source for pig iron in Brazil is an anomaly – 98.5% of companies worldwide use other sources such as coking coal.¹²⁰ The predictable solution is to use plantation timber as the raw product.

Accordingly, this Amazon region has seen an explosion of eucalyptus plantation development.¹²¹ Unfortunately, this rapid growth of eucalyptus plantations could present serious consequences to local communities.

Local NGOs, such as Justiça nos Trilhos, Fórum Carajás, Movimento Sem Terra and Comissão Pastoral da Terra, point to the lack of public input into the expansion of eucalyptus plantations.¹²² These NGOs also report that the rapid plantation expansion and accompanying pressure on arable land is on track to displace people in the region.^{123,124} Associated concerns also include pressure on water resources, because eucalyptus cultivation is water-intensive, and these groups report that eucalyptus expansion is diverting water from nearby small farms.¹²⁵ These NGOs describe the monoculture plantations as “green deserts” due to the lack of biodiversity and non-timber resources the forests offer.¹²⁶ Intensive pesticide use and the threat of contamination of water resources and neighbouring farmland is also an ongoing concern for local communities.¹²⁷

“

For at least 15 years, pig iron production was fed with only native forest. The trend now is the eucalyptus plantations that are a step backwards for the distribution of lands and small scale agriculture. The socio-environmental impacts are enormous. Rural settlements are becoming encroached by eucalyptus plantations that drain water sources and poison the soil with their heavy use of pesticides.

”

- Padre Dário Bossi,
one of the directors of the Justiça nos Trilhos network.¹²⁸



We fear that there is now a new pressure on the land. There is no way to be sure that there are no new areas being deforested in order to plant eucalyptus for the purposes of freeing the pig iron companies from liability.”



– Edmilson Carlos Pinheiro,
Executive Secretary of the NGO Fórum Carajás.¹²⁹

In 2009, during the Conference of the Parties in Copenhagen (COP15), the Brazilian government proposed a “Green Steel” programme, expressing its support for charcoal produced from planted eucalyptus.¹³⁰ The government identified this expansion as a key strategy to reduce greenhouse gas emission and brand Brazilian pig iron and steel as more climate-friendly.¹³¹ This support is based on assumptions that the full life cycle of charcoal from plantations emits less greenhouse gas emissions than the use of coking coal, and that all charcoal used would come from planted forests and not drive further deforestation.¹³²

Greenpeace urges caution, as the methodology traditionally used for the calculation of greenhouse gas emissions for biomass is often flawed¹³³ and conversion of natural forest for monoculture timber plantations worldwide is a major driver of deforestation.¹³⁴ Strong environmental and social safeguards must be in place for plantation management and future expansion plans.

Legal settlement in Pará state? Not without industry-wide reform

In February 2012, pig iron companies Cosipar, Sidepar and Iberica signed a legal settlement with the Federal Prosecutor in Pará State.¹³⁵ The settlement relieved the pig iron companies from \$106m US dollars in fines and related legal actions.¹³⁶

This settlement outlines new reforms for addressing tainted charcoal sources and is a step in the right direction. In addition, the settlement doesn’t immediately halt the use of native forest for charcoal. In fact, it allows for almost three more years of rainforest destruction.¹³⁷ Without a similar commitment from the neighbouring state of Maranhão there is a high likelihood of leakage, with illicit charcoal from Pará fuelling pig iron furnaces in Maranhão.

ICC – The Citizen’s Charcoal Institute: only empty words

The Citizen’s Charcoal Institute is an industry group that was formed in 2004 to address incidences of slave labour, and its Board is chaired by Viena.¹³⁸ Although ICC membership requires a pledge to not use slave labour and it provides for third party audits, slave labour remains rife in the sector.

There are no consequences for non-compliance with ICC policy. The industry group has proven itself unable to tackle the ongoing problem of illegalities in the sector, and does not address the use of native forest for charcoal production. Membership of the ICC consists of less than half of the 18 pig iron companies in the region that use wood charcoal.¹³⁹

The Dilma’s government response: not just little action, but also steps backward

Despite the lack of governance in the Amazon and its consequences illustrated in this report, the Brazilian government under President Dilma Rousseff is further weakening the government’s ability to monitor the region and enforce the law in these areas.

In Brazil, the state governments are given authority for evaluating, issuing and monitoring forestry permits.¹³⁶ Forestry laws, until recently, could also be enforced by federal agencies like Ibama. This mandate helped turn Ibama into one of the principal agencies for effectively investigating environmental crimes in Brazil and penalising perpetrators. Despite having few resources, Ibama is generally considered in the Amazon to be significantly more effective than the state-level environmental agencies. Furthermore, Ibama – as a federal agency – is less vulnerable to local economic and political influence. As outlined in other investigations by Greenpeace¹³⁷, these influences tend to limit state-level environmental enforcement in Brazil.¹⁴⁰

Instead of investing more into Ibama to fight illegalities and corruption, at the end of 2011 President Dilma’s government approved a law that severely limited Ibama’s mandate and consequentially reduced its ability to do its job. This law, Lei Complementar 140, only allows the authorities that issue forestry permits to enforce forest laws and issue fines or citations for noncompliance.¹⁴¹ Because only state agencies issue forestry permits, only these agencies can take action against illegal logging and deforestation, effectively sidelining Ibama and other federal efforts.¹⁴²



#6

Conclusions and demands

The harsh reality of the charcoal and pig iron industry in the north-eastern Amazon is reminiscent of Brazil's past – slavery, forest destruction and the wiping out of indigenous communities.

Despite endemic slavery and environmental destruction within the region's pig iron sector, the industry enjoys robust sales abroad, primarily to the US. The lack of serious attention from the US market, in the face of readily available reports, has not helped control the impunity and illegality rife in the industry and fuelling the region's devastation. The Brazilian government has allowed forest degradation in the region to continue to the point that the region's illegal loggers and illicit charcoal companies are on track to destroy the remaining forest in the region and the ability of the region's indigenous peoples to live off their forested lands.

Furthermore, while this report was being written, the Brazilian Congress had recently approved legislation to change the Brazilian Forest Code.¹⁴³ In the opinion of not only environmentalists, but also scientists and forest policy experts, these Forest Code changes will weaken forest protection and grant amnesty to those who committed environmental crimes in the past.¹⁴⁴ Furthermore, the government's power to combat environmental crimes will be reduced. The new Forest Code will stimulate impunity and permit an increase in deforestation that will drive further forest loss, impact on forest-dwelling people, and fuel social conflict.

The ongoing violence and social abuse through the role of slave labour in the industry and the social impact of plantations illustrate a clear lack of governance and participatory land-use planning in the region. The picture painted in the north-eastern Amazon, over the past few decades, undermines Brazil's claims of sustainability and modernity.

Greenpeace demands:

Automakers, construction firms and other heavy users of steel:

1. **Identify** whether your suppliers use **pig iron processed with charcoal** and demand that those suppliers, both direct and indirect, put in place **verifiable, monitorable and reportable means** of demonstrating their supply chain is **free of forest destruction and slavery**.
2. **Require** eucalyptus plantations that fuel pig iron production in your supply chain to have **adequate environmental and social safeguards**, including but not limited to a **zero deforestation policy**, and **free, prior and informed consent** of local communities.

Brazilian federal and state governments:

1. **Take immediate action** to address the environmental and social illegalities rife in the charcoal and pig iron industries, including a **taskforce to investigate and prosecute the invasions** into the Awá and other indigenous lands
2. **Provide** the Federal Public Prosecutor office **proper capacity to monitor** the progress of the **legal settlements** concerning the region's pig iron companies.
3. **Do not approve** changes to the Forest Code, **reject** Lei Complementar 140, and **do not allow** other legislative changes that undermine environmental protection or the ability of federal agencies to enforce the law.
4. **Do not approve** any policies that **weaken protection** for indigenous people or **facilitate the redefinition and reduction** of legally protected indigenous lands.
5. **Ensure** that eucalyptus plantations (including future expansion plans) fuelling the pig iron industry have **adequate environmental and social safeguards**.
6. **Support research efforts** that **improve the efficiency** of wood charcoal as fuel or **reduce wood charcoal's inherent socio-environmental risks** to local communities.

Endnotes

- 1** Rosillo-Calle F et al (1996). The charcoal dilemma: finding sustainable solutions for Brazilian industry.
- 2** Uhlig A, Goldemberg J & Coelho ST (2008). O uso de carvão vegetal na indústria siderúrgica brasileira e o impacto sobre as mudanças climáticas. *Revista Brasileira de Energia*, Vol. 14, No. 2, 2º September 2008, pp. 67-85.
- 3** Vale. Conheça a Vale.
<http://www.vale.com/pt-br/conheca-a-vale/paginas/default.aspx>
- 4** Assis WS & Carneiro MD (2011). O uso do carvão vegetal como fonte de energia no Pará - o Parque Siderúrgico de Carajás: controvérsias sociais, ambientais e econômicas. In: Porro R, Toni F (Org.). *Energia na Amazônia*. Belém: Iniciativa Amazônica, 2011.
- 5** Antoni GD (2010). O programa piloto para proteção das florestas tropicais do Brasil (PPG-7) e a globalização da Amazônia. *Ambient. Soc.*, Campinas, v. 13, n. 2, December 2010.
- Hall AL (1991). *Amazônia: desenvolvimento para quem? Desmatamento e conflito social no Programa Grande Carajás*. Rio de Janeiro: Jorge Zahar, 1991.
- 6** "Indigenous Lands" as used in this report refers to Terras Indígenas, a Brazilian legal classification for legally protected lands that are demarcated based on the presence of indigenous populations. For more background, see: Hutchison M et al (2004). *Demarcation and registration of indigenous lands in Brazil*. University of New Brunswick, November 2004.
- 7** Kato M et al (2005). World at work: Charcoal producing industries in Northeastern Brazil. *Occupational and Environmental Medicine*, Vol. 62, p128-132, 2005.
- 8** Assis WS & Carneiro MD (2011) op cit.
- 9** Comitê Interministerial sobre Mudança do Clima (2008). Plano nacional sobre mudança do clima.
<http://www.mds.gov.br/aceso-a-informacao/orgaoscolegiados/orgaos-em-destaque/ciisc/arquivos/Plano%2520Nacional%2520de%25>
- 10** Barrington C (2010). Merchant Pig Iron: Overview of Global Trends. International Pig Iron Association.
<http://www.gladiatorresources.com.au/Pig.pdf>
- 11** Ministério do Trabalho e do Emprego (2011). Cadastro de Empregadores Previsto na Portaria Interministerial nº 2 de 12 de maio de 2011.
http://portal.mte.gov.br/trab_escravo/portaria-do-mte-cria-cadastro-de-empresas-e-pessoas-autuadas-por-exploracao-do-trabalho-escravo.htm
- 12** Uhlig A, Goldemberg J & Coelho ST (2008) op cit.
- 13** Shahinian G (2010). Report of the Special Rapporteur on contemporary forms of slavery, including its causes and consequences – Mission to Brazil. Human Rights Council, United Nations. New York.
http://www.ilo.org/sapfl/Informationresources/NonILOpublications/WCMS_144676/lang--en/index.htm
- 14** Costa PTM (2009). Fighting forced labour: The example of Brazil. International Labour Office, International Labour Organization. Geneva.
http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_111297.pdf
- 15** United States Department of Labor (2011). List of goods produced by child labor or forced labor. 2011.
<http://www.dol.gov/ilab/programs/ocft/PDF/2011TVPRA.pdf>
- 16** Ministério do Trabalho e do Emprego (2011) op cit.
- 17** Repórter Brasil (2012). Trabalho escravo e destruição do meio ambiente.
http://www.escravonempensar.org.br/upfilesfolder/materiais/arquivos/tec_meioambiente_web01.pdf
- 18** Ministério do Trabalho e do Emprego (2010). Quadro das operações de fiscalização para erradicação do trabalho escravo.
http://portal.mte.gov.br/data/files/8A7C816A308E140C013099AA320A62A2/est_resultado_quadro_trabescravo2010.pdf
- 19** Bales K (1999). Brazil - Life on Edge. In: *Disposable People: New Slavery in the Global Economy*, University of California Press.
- 20** Ministério do Trabalho e Emprego (2009). Relatório de fiscalização: Carvoaria do Cleminson e Manuel.
- 21** Kato M et al (2005) op cit.
- 22** Ibid.
- 23** Ibid.
- 24** Ibid.
- 25** Secretaria de Estado de Meio Ambiente do Pará (2008). Instrução Normativa no. 1/2008 de 10/03/2008. Dispõe sobre normas e procedimentos para disciplinar o uso da Guia Florestal GF-PA para o transporte de produtos e/ou subprodutos de origem florestal do Estado do Pará.
- 26** Conselho Nacional de Meio Ambiente (2009). Resolução nº411, de 6 de maio de 2009.
<http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=604>
- 27** Assis WS & Carneiro MD (2011) op cit.
- 28** Secretaria de Estado de Meio Ambiente do Pará (2008) op cit.
- 29** Conselho Nacional de Meio Ambiente (2009) op cit.
- 30** Monteiro MA (2006). Em busca do carvão vegetal barato: o deslocamento de siderúrgicas para a Amazônia. *Novos cadernos NAEA*, vol. 9, n. 2, p55-97.
- 31** Ibama (2011). Operação Saldo Negro.
- 32** Assis WS & Carneiro MD (2011) op cit.
- 33** Ibid.
- 34** Ibid.
- 35** Uhlig A, Goldemberg J & Coelho ST (2008) op cit.

- 36** Secretaria do Meio Ambiente do Pará (2009). Instrução Normativa Nº 23, de 31 de março de 2009. http://www.sema.pa.gov.br/interna.php?idconteudocoluna=2296&idcoluna=14&titulo_conteudocoluna=23
- 37** Ibama (2011) op cit.
- 38** Fundação Nacional do Índio (2009). Expedição da Funai confirma a existência de índios isolados no Maranhão. http://www.funai.gov.br/ultimas/noticias/2_semestre_2009/dezembro/un2009_10.html
- 39** Steel Business Briefing (2007). Charcoal shortage prompts coke imports in northern Brazil. http://www.steelbb.com/?PageID=157&article_id=28919
- 40** Silva JCR (2010). Acha que matar árvores é assassinato. TEDx Amazônia, Manaus. <http://www.tedxamazonia.com.br/tedtalk/ze-claudio>
- 41** Ibid.
- 42** Instituto Nacional de Pesquisas Espaciais (2012a). Projeto Prodes. 2. <http://www.obt.inpe.br/prodes/index.php>
- 43** Ibid.
- 44** Instituto Nacional de Pesquisas Espaciais (2012b). Projeto Prodes - Desmatamento nas Unidades de Conservação. 2012. <http://www.dpi.inpe.br/prodesdigital/prodesuc.php>
- 45** Instituto Nacional de Pesquisas Espaciais (2012a) op cit.
- 46** Instituto Nacional de Pesquisas Espaciais (2012b) op cit.
- 47** Fundação Nacional do Índio (2009) op cit.
- 48** Instituto Nacional de Pesquisas Espaciais (2012b) op cit.
- 49** TV Globo – Fantástico (2011). Índias da tribo Awá-Guajá amamentam filhotes da floresta. <http://fantastico.globo.com/Jornalismo/FANT/0,,MUL1640337-15605,00.html>
- 50** Instituto Nacional de Pesquisas Espaciais (2012b) op cit.
- 51** International Union for the Conservation of Nature (IUCN) (2012). Red List of Endangered and Threatened Species - Spatial Data Download. <http://www.iucnredlist.org/technicaldocuments/spatial-data>
- 52** Caso A et al (2008). *Panthera onca*. In: International Union for the Conservation of Nature (IUCN) (2012) op cit.
- 53** Fundação Nacional do Índio (2012). Nota sobre as ações de proteção e promoção dos direitos do povo Awá-Guajá. http://www.funai.gov.br/ultimas/noticias/2012/04_abr/20120430_16.html
- 54** Ibid.
- 55** Ibid.
- 56** Portal Brasil (2012). Reserva Biológica do Gurupi - MA. <http://www.brasil.gov.br/localizacao/parques-nacionais-e-reservas-ambientais/reserva-biologica-do-gurupi-2013-ma>
- 57** Fundação Nacional do Índio (2012) op cit.
- 58** Justiça Federal de 1º Grau. Seção Judiciária do Maranhão, 5º Vara. Sentença nº 410/2009/JCM/JF/MA – Tipo “A”. 30 June 2009
- 59** Instituto Nacional de Pesquisas Espaciais (2012b) op cit.
- 60** Fundação Nacional do Índio (2009) op cit.
- 61** Santana R (2012). “Tratores de madeireiros passaram por cima do acampamento Awá, destruindo tudo”, diz missionária do Cimi. <http://www.cimi.org.br/site/pt-br/?system=news&action=read&id=6047>
- 62** Survival International (2011). Amazon indian nomad beaten up by loggers. <http://www.survivalinternational.org/news/7714>
- 63** Fundação Nacional do Índio (2009) op cit.
- 64** Instituto Nacional de Pesquisas Espaciais (2012a) op cit.
- 65** Instituto Chico Mendes (2011). Rebio do Gurupi - Inventário da avifauna e mastofauna. <http://www.icmbio.gov.br/portal/o-que-fazemos/pesquisa-e-monitoramento/projetos-apoiados/2011/286-rebio-do-gurupi-inventario-da-avifauna-e-mastofauna.html>
- 66** Centro Nacional de Pesquisa e Conservação de Primatas Brasileiros (CPB). http://www4.icmbio.gov.br/cpb/index.php?id_menu=24&id_arq=106
- 67** International Union for the Conservation of Nature (IUCN) (2012) op cit.
- 68** Instituto Chico Mendes (1998). Rebio do Gurupi. <http://www.icmbio.gov.br/portal/biodiversidade/unidades-de-conservacao/biomas-brasileiros/amazonia/unidades-de-conservacao-amazonia/1998-rebio-dogurupi.html>
- 69** Instituto Nacional de Pesquisas Espaciais (2012b) op cit.
- 70** Moura WC et al (2011). A Reserva Biológica do Gurupi como instrumento de conservação da natureza na Amazônia Oriental, In: Amazônia Maranhense – Diversidade e Conservação. Belém.
- 71** Instituto Nacional de Pesquisas Espaciais (2012a) op cit.
- 72** AliceWeb. Data from 2010 and 2011. <http://aliceweb.desenvolvimento.gov.br/>
- 73** Piers (2012). US Customs data. <http://www.piers.com/>
- 74** Confidential documentation, copy held by Greenpeace.
- 75** Piers (2012) op cit.
- 76** Confidential documentation, copy held by Greenpeace.
- 77** Ibid.
- 78** John Deere. http://www.deere.com/pt_BR/ag/about_us/mundo.html

- 79** Smith M & Voreacos D (2006). Slaves in Amazon Forced to Make Material Used in Cars. Bloomberg Markets. <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a4j1VKZq34TM>
- 80** Ibid.
- 81** Al-Jazeera (2012). Slavery: A 21st Century Evil: Charcoal Slaves, 25 Mar 2012. <http://www.aljazeera.com/programmes/laverya21stcenturyevil/2011/10/20111010114656316634.html>.
- 82** Assis WS & Carneiro MD (2011) op cit.
- 83** BNDES (2000). Ferro gusa: Metálico Alternativo. Mineração e Metalurgia, no 41.
- 84** Viena Siderúrgica S/A. Mercado. <http://www.vienairon.com.br/produto/mercado.aspx>
- 85** Confidential documentation, copy held by Greenpeace.
- 86** Ministério do Trabalho e do Emprego (2011) op cit.
- 87** Repórter Brasil (2012). Lista suja do trabalho escravo. <http://reporterbrasil.org.br/pacto/listasuja/lista>
- 88** Secretaria de Estado de Meio Ambiente do Pará. Licença de Operação. <http://monitoramento.sema.pa.gov.br/simlam/>
- 89** Confidential documentation, copy held by Greenpeace.
- 90** Ibid.
- 91** Ibama. <http://www.ibama.gov.br/protocolo/>
- 92** Confidential documentation, copy held by Greenpeace.
- 93** Ibid.
- 94** Ibama (2011) op cit.
- 95** Ibid.
- 96** Confidential documentation, copy held by Greenpeace.
- 97** Paula GG & Pereira AR (1980). Dimensionamento de uma frota de caminhões para transporte de carvão vegetal por meio da programação linear. Instituto de Pesquisas e Estudos Florestais, no.21, pp. 85-95. <http://www.ipef.br/publicacoes/scientia/nr21/cap06.pdf>
- 98** Secretaria de Estado de Meio Ambiente do Pará. Instrução Normativa no. 1/2008 de 10/03/2008. Dispõe sobre normas e procedimentos para disciplinar o uso da Guia Florestal GF-PA para o transporte de produtos e/ou subprodutos de origem florestal do Estado do Pará.
- 99** Ibama (2011) op cit.
- 100** Confidential documentation, copy held by Greenpeace.
- 101** Ibid.
- 102** Ibama (2011) op cit.
- 103** Ibid.
- 104** Confidential documentation, copy held by Greenpeace.
- 105** Ibid.
- 106** Ibama (2011) op cit.
- 107** Confidential documentation, copy held by Greenpeace.
- 108** Piers (2012) op cit.
- 109** Confidential documentation, copy held by Greenpeace.
- 110** Ibama (2012) op cit.
- 111** Ibid.
- 112** Ibid.
- 113** Ibid.
- 114** Ibid.
- 115** Ibid.
- 116** Ibid.
- 117** Ministério Público Federal do Pará (2012a). Termo de Compromisso e Ajuste de Conduta (Sidepar), de 16 de fevereiro de 2012. <http://www.prpa.mpf.gov.br/news/2012/TERMO%20DE%20COMPROMISSO%20-%20SIDEPAR.PDF>
- 118** Ministério Público Federal do Pará (2012b). Termo de Compromisso e Ajuste de Conduta (Cosipar), de 17 de fevereiro de 2012. <http://www.prpa.mpf.gov.br/news/2012/TERMO%20DE%20COMPROMISSO%20-%20COSIPAR.PDF>
- 119** Ministério Público Federal do Pará (2012c). Termo de Compromisso e Ajuste de Conduta (Siderúrgica Ibérica), de 16 de fevereiro de 2012. <http://www.prpa.mpf.gov.br/news/2012/TAC%20Iberica.pdf>
- 120** Paula GM (2009). Ferro: Análise das possibilidades de adensamento das cadeias produtivas no Maranhão. São Luis, Fiema.
- 121** Assis WS & Carneiro MD (2011) op cit.
- 122** Interviews conducted by Greenpeace in October 2011.
- 123** Repórter Brasil (2011). Deserto Verde - Os impactos do cultivo de eucalipto e pinus no Brasil. http://escravonempensar.org.br/upfilesfolder/materiais/arquivos/cartilha_deserto%20verde.pdf
- 124** Dantas A (2012). Mais água para o grupo Suzano no Maranhão. <http://www.forumcarajas.org.br/>
- 125** Repórter Brasil (2011) op cit.
- 126** Ibid.
- 127** Assis WS & Carneiro MD (2011) op cit.

- 128** Interview conducted by Greenpeace in October 2011.
- 129** Suzuki N (2007). Polêmico, Distrito Florestal no Carajás opõe movimentos e governo. Carta Maior. http://www.cartamaior.com.br/templates/materiaMostrar.cfm?materia_id=14427
- 130** Ministério do Meio Ambiente (2009). Aço verde para a siderurgia brasileira. <http://www.cop15.gov.br/pt-BR/indexea3c.html?page=noticias/aa-o-verde-para-a-siderurgia-brasileira>
- 131** Ibid.
- 132** Comitê Interministerial sobre Mudança do Clima (2008) op cit.
- 133** Johnson E (2009). Goodbye to carbon neutral: Getting biomass footprints right. *Environmental Impact Assessment Review*, 29(3): p. 165-168.
- 134** Greenpeace International (2010). How Sinar Mas is Pulping the Planet. <http://www.greenpeace.org/international/en/publications/reports/SinarMas-APP/>
- 135** Ministério Público Federal do Pará (2012a), (2012b) & (2012c) op cit.
- 136** Ministério Público Federal do Pará (2012d). Siderúrgicas que atuam no Pará assinam acordo com MPF contra o desmatamento e o trabalho escravo. 1 <http://www.prpa.mpf.gov.br/news/2012/siderurgicas-que-atuam-no-para-assinam-acordo-com-mpf-contr-o-desmatamento-e-o-trabalho-escravo>
- 137** Ministério Público Federal do Pará (2012a), (2012b) & (2012c) op cit.
- 138** Instituto do Carvão Cidadão. <http://www.carvaocidadao.org.br/empresa/>
- 139** Ibid.
- 140** See for example: Greenpeace International (2003). Pará: State of Conflict. 2003. <http://www.greenpeace.org/international/en/publications/reports/state-of-conflict/>
- 141** Presidência da República, Casa Civil (2011). Lei Complementar Nº 140, de 8 de dezembro de 2011. http://www.planalto.gov.br/ccivil_03/leis/LCP/Lcp140.htm
- 142** See also:
- A análise de Mukai TA (2011). A análise de Mukai TA, Lei Complementar nº 140, de 8 de dezembro de 2011, que fixa diretrizes para a cooperação entre os entes federativos em matéria ambiental, Fórum de Direito Urbano e Ambiental, Belo Horizonte, ano 10, n. 60, Nov/Dec 2011. <http://www.fiesp.com.br/sindical-juridica/pdf/artigo%20-%20prof.%20toshio%20mukai.doc.pdf>
- Giovanini D (2011). Lei Complementar 140 – o prenúncio do caos. O Estado de São Paulo. <http://blogs.estadao.com.br/dener-giovanini/lei-complementar-140-%E2%80%93-o-prenuncio-do-caos/>
- Observatório Eco (2011). Entrou em vigor lei que retira poderes do Ibama. O Eco. <http://www.oeco.com.br/noticias/25529-entrou-em-vigor-lei-que-retirapoderes-do-ibama>
- 143** Câmara dos Deputados (1999). PL 1876/1999. <http://www.camara.gov.br/proposicoesWeb/fichadetramitacao?idProposicao=17338>
- 144** Comitê Brasil em Defesa das Florestas e do Desenvolvimento Sustentável (2012). Código Florestal e a Ciência: o que nossos legisladores ainda precisam saber. <http://www.ipam.org.br/biblioteca/livro/Codigo-Florestal-e-a-Ciencia-o-que-nossoslegisladores-ainda-precisam-saber/618>



GREENPEACE

Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

For more information contact:
pressdesk.int@greenpeace.org

JN 443

Second Edition
Published in December 2012 by

Greenpeace International
Ottho Heldringstraat 5
1066 AZ Amsterdam
The Netherlands