



Ecuador

## A worrying windfall

EWEGONO, ECUADOR

**The wind-power boom set off a scramble for balsa wood for turbines' blades—with unintended consequences**

**I**N LATE 2019 loggers started arriving in Ewegono, a village of nine indigenous Waorani families on the Curaray river in the Ecuadorean Amazon. They were looking for balsa, a fast-growing species of tree whose wood is used in blades for wind-power turbines. There was a global shortage. At first, villagers “grabbed chainsaws, axes and machetes to cut it down”, says Saúl Nihua, Ewegono’s leader. The pay could be \$150 a day, a fortune in a region where most people have no jobs.

Soon the harvest became a free-for-all. Some loggers got permits with the help of the Waorani, but others forged them and invaded the indigenous reserve. Many took truckloads of wood without paying their workers. People from less remote places cut all the balsa they could find, stacking it along the road to Arajuno, the nearest town, says Mr Nihua. Buyers in trucks paid as little as \$1.50 per tree. Uncontrolled logging degraded the forest. “They’ve killed off vegetation tremendously...without respecting legal limits,” says Mr Nihua, who

partly blames himself. He encouraged his fellow Waorani to earn money from the coveted timber. The influx of cash and liquor fuelled family violence.

The origin of the crisis lies oceans away, in growing demand for wind power from the world’s largest economies. Thanks to ambitious targets to reduce the use of fossil fuels and technology that is bringing down turbine prices, global wind-power capacity has been increasing by 9% a year over the past decade. In 2020 new installed capacity surged by 24% to a record 78gw. Wind farms in China and the United States, which made up 60% of that demand, were rushing to install them before tax credits and subsidies expired. “It was like the end of a gold rush,” says a China-based representative of a Western turbine maker.

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Unlike gold, wind turbines benefit the whole world, not just their owners. They are an indispensable technology for phasing out fossil fuels. But “the sudden surge in demand put enormous strain on the entire wind-industry supply chain,” says Shashi Barla of Wood Mackenzie, a consultancy. Wind fever caused the biggest problems in Ecuador, which provides more than 75% of the world’s balsa. The word is Spanish for “raft”.

A stiff, light wood that is also used in model aeroplanes and real aircraft, balsa goes into the core of a blade, where it is sandwiched between two fibreglass “skins” to add strength. Windmills built in the 1980s had 15-metre (49-foot) blades and could generate 0.05mw of electricity. Now, an offshore wind turbine with blades more than 100 metres long generates up to 14mw. Bigger blades require more balsa. Engineers at the National Renewable Energy Laboratory in the United States have calculated that a 100-metre blade requires 150 cubic metres (5,300 cubic feet) of balsa wood, or several tonnes.

Balsa trees reach optimal density in just five to seven years, which has helped suppliers cope with rising demand. Leading turbine manufacturers like Vestas in Denmark and Siemens Gamesa, in Spain, get most of their wood (along with foam, a less popular substitute) from three core-materials suppliers. 3A Composites, a Swiss firm, has more than 10,000 hectares ▶▶

▶ (25,000 acres) of balsa plantations in Ecuador's coastal lowlands. Gurit (also Swiss) and Diab (Swedish) depend on independent suppliers and farmers growing balsa along with other crops, to whom they give seeds and training.

It is harder to predict demand for balsa than for, say, Christmas trees. As a result, says Ray Lewis of Diab, "there has always been a bit of a balsa crisis." Rising demand in the mid-2000s led to new plantations. But in 2011 turbine installations slowed sharply due in part to tighter regulations and a slower economy in China. Balsa prices plummeted. Growers planted less of it in Ecuador.

The most recent crisis was different. Demand, which revived in 2018, outstripped the supply of plantation-grown balsa by a lot, not a little. The price doubled from mid-2019 to mid-2020. In 2019 Ecuador exported \$219m-worth of balsa wood, 30% more than the previous record in 2015 (see chart). In the first 11 months of 2020, it exported balsa worth \$784m. Diab sold balsa for \$1,800 per cubic metre in 2020, three times what it had in 2018.

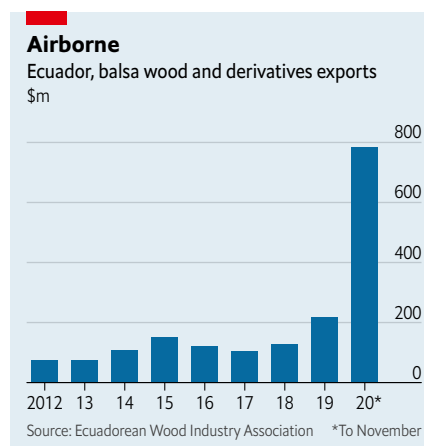
### Easterly wind

The main source of new demand was China, which has built more turbines than any other country. In 2006 it had just 2.6GW of installed capacity, compared with 21GW in Germany and 12GW in the United States. By 2019, when Germany had 61GW and the United States had 105GW, China had blown past both, to 236GW. At the end of last year China's president, Xi Jinping, announced plans to reach 1,200GW of wind and solar capacity by 2030.

Chinese turbine manufacturers such as Goldwind and Envision, founded in 1998 and 2007 respectively, now have nearly 30% of global market share. They have erected turbines in dozens of countries. At first they used the same handful of Western blademakers and core-material suppliers as their competitors, but before long Chinese firms had edged into all levels of the supply chain. Sino Composite bought a stake in Cobalsa, a long-established Ecuadorean balsa firm.

The rising price of balsa also lured middlemen "like bees to a honeypot", says Mr Lewis. A 40-year veteran of the wind industry, he got emails from companies he had never heard of offering to sell him truckloads of balsa. He ignored them. Chinese firms, though, were aggressive buyers. Some set up roadside sawmills. More than 75% of Ecuador's balsa exports in the first 11 months of 2020 ended up in China. Despite having one of its best years ever, Plantabal, 3A's Ecuadorean subsidiary, saw its share of balsa exports drop from 20-25% to 8%, while Diab's fell from 15% to 5-6%.

The balsa boom, and the bust that has now followed, recall the rush to exploit



rubber in the Amazon at the beginning of the 20th century. Rubber-tappers employed in slave-like conditions supplied industrialising Europe and the United States until production shifted to Asia, leaving them even more wretched. Indigenous Ecuadoreans have more protections, but are still vulnerable to exploitation. Like miners and oil-drillers before them, *balseiros* "took advantage" of indigenous poverty and naivety, says Mr Nihua. The Waorani have been in contact with society only since the 1950s.

Often payment from loggers was partly in the form of liquor or marijuana; that encouraged drug abuse and violence, which were already big problems. Gilberto Nenquimo, the president of the Waorani Nation of Ecuador (NAWE), says that his brother-in-law was murdered with a chainsaw in a dispute over balsa.

Overlogging was another result. Balsa trees get less regulatory protection than older, rarer trees. Fast-growing "pioneer species" can be chopped down almost anywhere, including in the rainforest, using simplified "collection permits". Balsa taken illegally—without legitimate permits or from protected areas like Yasuni National Park, which is home to uncontacted tribes—can be "laundered" by mixing it with other wood, says a customs agent. At the height of the frenzy, loggers extracted trees too young to be suitable for blademaking or shipped balsa to China without drying it, which meant it rotted on the way. The environment ministry boasts that it checked 1.4m cubic metres of balsa in 2020, twice as much as in 2019, and confiscated four times as much. But the total amount seized was less than 4,000 cubic metres.

Balsa is not an important store of carbon like bigger trees in the Amazon, but unregulated logging encourages traffic, hunting and extraction of species besides balsa. Denuded riverfronts raise the risk of flooding. The Global Forest Watch, an online platform that uses satellite data to track deforestation, recorded an "unusually high" number of "tree-cover loss

alerts" in Ecuador in the second half of 2020, concentrated in the Amazon region. Land is Life, an NGO, says that extraction of balsa is partly to blame.

After several assemblies, the Waorani decided in October to kick out the loggers. The Wampis, another indigenous group that lives on a 1.3m-hectare territory on the border of Ecuador and Peru, made the same decision. When their guests refused to leave, the tribe seized seven boatloads of wood. The loggers retaliated by holding 19 Wampis hostage at a river crossing on December 2nd. They were released later that day, after Peruvian authorities persuaded the tribe to hand over the wood.

To get to Ewegono from Puyo, you zigzag down a narrow road to Arajuno, past two large sawmills. (One, called Hesselent, was built in 2018 by a Chinese businessman, corporate records show.) Then, from a tiny port on the Curaray river where all that remains of a logging camp are mounds of sawdust and rubbish, you board a *peke-peke*, a wooden canoe with a trolling motor. Loggers left Ewegono just before *The Economist* arrived in December, but signs of the balsa boom were still visible: a new social hall, a satellite dish and sawdust outlining a football pitch.

The bust had clearly begun. Piles of balsa were stacked messily near the river. The price of balsa had fallen by half because Chinese turbine companies halted their work until after Chinese new year in February. Villagers were collecting donations for a man who had burned himself in a drunken domestic dispute. On a scrubby river island stripped of most trees, locals were growing maize. "Three years ago, this was full of balsa," said Johnny Tocari, of NAWE. A few scrawny balsa stalks, identifiable by their heart-shaped leaves, had started to reclaim the banks.

### Fresh blades

There is a chance that last year's balsa boom will be the last. The shortage accelerated a shift to blade cores made partly or completely of PET, a synthetic foam that is cheaper but was long considered inferior. After Vestas, the world's largest turbine-maker, introduced the first all-PET blade designs, others began to adopt them. In 2020, "all the CEOs had to do a second bill of materials" that excluded balsa, says Mr Lewis. "Now their success depends on their ability to switch."

Wood Mackenzie forecasts that the share of PET will increase from 20% in 2018 to more than 55% by 2023, with demand for balsa staying stable. Chinese blademakers will continue to use it in the short term, since they have yet to make PET price-competitive, says the China-based representative. Balsa's long-term future as a blade component depends in part on whether the problems Ecuador has experienced over ▶▶



▶ the past couple of years can be solved.

Ecuadorian officials and indigenous folk hope so. In November, after news reports about social and environmental damage from the balsa boom, the environment ministry excluded balsa from the list of the fast-growing species that can be logged with simplified permits. It is drafting stricter rules for how it can be harvested from forests.

The Waorani plan to start a co-operative to harvest balsa sustainably and sell it at fair prices to a lumber plant in Guayaquil. Similar initiatives are springing up across the region, some funded by NGOs like the Nature Conservancy, others by balsa exporters like Plantabal. They hope that consumers of green energy will care enough to insist on high social and environmental standards. "Would a person in Stockholm charging an electric car with energy generated from wood bought illegally in the Amazon feel right about that?" wonders Ramón del Pino, Plantabal's CEO. The answer is probably no. The question is whether drivers in Beijing will feel the same. ■

## Colombia

# Bootleg bonanza

MEDELLÍN

**The government is fighting a black market that its policies helped create**

ROGELIO GUTIÉRREZ, who lives in Castilla, a violent area of northern Medellín, chugs a bottle of *chirrinchi*, a mix of alcohol, water and sugar, every day. He earns the money to buy it by guarding tables and chairs at a food stall when it is closed in the mornings. At noon the 76-year-old, whose vision is clouded by cataracts, slowly walks three blocks to a garden house. He hands 5,000 pesos (\$1.40) to a man sitting on the pavement. The man enters the house and returns with a black plastic bag. Mr Gutiérrez (not his real name) clasps it to his chest, walks five blocks and settles down underneath a pedestrian bridge. He pulls out the bottle and stares at it. He cannot see the sediment in the colourless liquid.

In the green house is Mr Gutiérrez's favourite *alambique*, or maker of bootleg liquor. Medellín's northern neighbourhoods have thousands, each controlled by a *combo* (criminal gang). The *chirrinchi* he drinks is the lowest grade of liquor you can buy in Medellín. *Alambiques* also produce counterfeit aguardiente, an aniseed-flavoured spirit served at every Colombian festivity. Some also make rum and whisky. Each *combo* controls not just the *alambiques* in their territories but also the bars and shops that sell fake and smuggled alcohol. In Cas-

tilla it is hard to find a legal bottle of spirits.

Medellín, Colombia's second-largest city and the capital of the department of Antioquia, is the country's centre of bootleg booze. But the problem is widespread. The *alambiques* on the outskirts of Villavicencio, in the eastern plains, are run by FARC guerrillas who rejected a peace deal with the government signed in 2016. A study by Daniel Rico, director of c-Analysis, a consultancy that advises governments and firms on how to counter criminal enterprises, says half of the alcohol sold in some cities is illegal.

While the government combats bootlegging, its policies encourage it. Chief among them is the state's monopoly on distilling and selling spirits. In the 1700s the Spanish crown, keen to cash in on colonials' quaffing, took control of the production of aguardiente (which Spaniards had brought to South America). Colombia's government held on after independence in 1819. The monopoly is enshrined in constitutions adopted since 1886. In the 20th century the government transferred it to the 32 semi-autonomous regions, which have fewer sources of revenue.

The monopoly gives departments the right to be the sole producers of spirits within their borders. They can choose to allow for sale only their own brands of aguardiente, which they can produce themselves or buy from manufacturers owned by other departments. Huila, in the south-west, outsources production of its aguardiente, Doble Anís, to Antioquia. Departments can also impose taxes and fees on imported brands. An example is Cundimarca, whose capital is Bogotá. The monopoly provides more than a third of departments' income.

Legal booze is thus expensive. A bottle of Antioqueño, Antioquia's aguardiente, costs around 40,000 pesos. Unsurprisingly, the *combos* undercut legitimate liquor.

Unlike drug-traffickers' inputs, the components of bootleg aguardiente are cheap and easy to get. *Alambiques'* equipment consists of a bucket or similar vessel, and a hose. Colombia imports most of its alcohol, the raw material, from Ecuador, where it is cheaper. The government does not keep track of such imports. Buyers within Colombia can get it from Mercado Libre, an online marketplace, or from manufacturers of perfume. Some *alambiques* in Castilla buy it from El Arriero, a store in central Medellín that sells aromatherapy oils. Some alcohol comes from workers at the departments' manufacturers, who sell it to *combos* on the sly.

Waste pickers provide the bottles. They sell the discards they find outside bars to "recycling companies", which clean and resell them to the *combos*. Hundreds of shops that cater to *alambiques* crowd the pavements of northern Medellín with sacks of clean empties, bearing the labels of Antio-

queño and Old Parr and Buchanan's whiskeys. They cost the *combos* no more than 500 pesos apiece. *Alambiques* keep them empty for as long as possible. If the police discover them no crime has taken place, says a former official who investigated the bootleg market in Medellín.

*Alambiques* are busiest on weekend nights. Their mixologists prepare whatever the local bars demand. The recipe for aguardiente is simple: two parts tap water to one part alcohol plus some aniseed essence (also available from El Arriero). Whisky is more complicated. Mixologists infuse alcohol with woody flavour by soaking in it a stocking filled with sawdust, says Mr Rico. Hygiene is not a priority. Paint cans and toilets serve as mixing vats.

*Alambiques* move every few days to avoid detection. Some take up temporary residence in houses or shops, whose occupants get paid. In Medellín's fourth *comuna*, the quarter that abuts Castilla, residents could be seen leaving a fried-chicken restaurant with plastic bags full of liquor bottles, not wings or drumsticks.

At least 26 people died in 2020 from drinking adulterated alcohol, reports Mr Rico's study. Although *combos* sometimes use methanol, which can cause blindness and death, they increasingly use potable ethanol to avoid attracting attention. Colombia has too few police to dismantle the thousands of *alambiques* in Medellín, Bogotá and other cities. Local and department officials take bribes to reopen bars that police shut down for selling illegal booze.

Mr Gutiérrez does not mind that the *chirrinchi* he drinks is illegal. He could not afford it otherwise, he says. But the dodgy drinks industry, which is encouraged by Colombia's antiquated monopolies, is putting his health at risk. The *combos*, by contrast, are thriving. ■



Candy is dandy but liquor is quicker

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