

Climate change: Bad for coffee, good for cocoa

BY LUC COHEN
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REUTERS

JINOTEGA, Nicaragua — Brimming with shade trees and bounded by the Tuma river, the lower climes of Roger Castellon's farm in Nicaragua's mountainous Jinotega department were long ideal for growing coffee.

But with temperatures on the rise, the veteran coffee farmer is shifting his lower-lying land to a crop that, although new for him, enjoys a rich legacy in the region: Cocoa.

"Coffee is no longer viable due to climate change," said Castellon, who calls his 1,038-acre farm "Los Nogales."

Soaring temperatures in Central America, linked to climate change, are forcing many farmers like Castellon to replace coffee trees with cocoa — a crop once so essential to the region's economy it was used as currency.

Farmers across the region, known for high-quality arabica beans, still are recovering from a coffee leaf rust disease known as roya, which devastated crops over the past four years.

Now, lower-altitude areas are becoming unsuitable for growing coffee as temperatures heat up. Cocoa thrives in the warmer weather.

Castellon maintains coffee plants on the higher portions of his farm, at about 3,937 feet. But two years ago he replaced coffee with cocoa on 208 acres of land at about 2,297 feet in altitude, protected by the shade of fig and banana trees.

He expects to produce his first cocoa crop this April and said planting the cocoa trees cost about a third of what it would have cost to renew coffee plants.

The quiet shift across the region shows up in export data: This crop year, coffee bean exports from six countries in the region, excluding Honduras, will fall for the third straight year, to 8.14 million 132-pound bags — the lowest level since the 1973/1974 cycle, according to the U.S. Department of Agriculture.

Cocoa production and exports have steadily risen. In Nicaragua, cocoa exports totaled 8.5 million pounds in 2015, up more than 80 percent from 2014, and in El



A man of the Nicaraguan ethnic tribe Sumos (left) picks coffee berries at the Nogales farm in Jinotega, Nicaragua, recently. Soaring temperatures in Central America due to climate change are forcing farmers to pull up coffee trees and replace them with cocoa, spurring a revival in the cultivation of a crop once essential to the region's economy. A farmer (right) stands in a cocoa plantation at the San Miguel farm in Matagalpa, Nicaragua, recently.



OSWALDO RIVAS | REUTERS



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A worker dries cocoa beans at the "Jorge Salazar" Cooperative in the town El Tule in Matagalpa, Nicaragua, recently. Soaring temperatures in Central America due to climate change are forcing farmers to pull up coffee trees and replace them with cocoa, spurring a revival in the cultivation of a crop once essential to the region's economy.

Salvador, a coalition is working to expand cocoa acreage hundredfold.

Even in Honduras, which has seen a successful recovery from roya, the government is requiring growers to substitute 8 percent of coffee land to cocoa.

To be sure, some new cocoa acreage has come from abandonment of other crops, and high-altitude coffee production is strong in many parts of the region. Central America also will not supplant West Africa as the leading supplier of the main ingredient in chocolate anytime soon.

But high cocoa prices are

providing an incentive to farmers to switch. The region's cocoa rebirth could ease concerns about supply stability amid growing emerging market demand, weather scares and the potential for civil strife in Ivory Coast and Ghana, which produce 60 percent of world output.

Coping with cocoa

In Nicaragua, the ideal coffee zone is between 2,297 and 5,577 feet above sea level, but rising temperatures and lower rainfall will shift the range to 3,281 and 5,577 feet by 2050, according to a 2012 study by the Inter-

national Center for Tropical Agriculture.

Temperatures have increased between 0.9 and 5.4 degrees Fahrenheit in the region in the past century, and temperatures in coffee zones are expected to rise another 3.8 Fahrenheit by 2050.

Roya has long plagued coffee production, but scientists say warmer weather will cause more harm because the disease thrives in high temperatures.

"Coffee is not for this region anymore — the yields are no good, and it's more investment," said Roberto Mairena, 51, who eight

years ago planted 21 acres of cocoa on his 984 to 1650 feet San Miguel farm in La Dalia, in the mountainous Nicaraguan department of Matagalpa.

The devastating impacts of roya forced many affected farmers to reconsider the wisdom of re-investing in coffee. Many decided on cocoa, calculating that rising temperatures would only make coffee in those areas more vulnerable.

"Leaf rust was an effect of climate change," said Ryan Bathrick, the Nicaragua country director for TechnoServe, a U.S. non-profit organization that

New bird flu strain emerges in US

BY TOM POLANSEK AND
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REUTERS

CHICAGO — U.S. farm and health officials are racing to assess the threat that a type of bird flu never before seen in the country poses to humans and poultry, employing emergency plans drawn up in the wake of a devastating outbreak in birds last year.

The federal government sprang into action on Friday after confirmation overnight that the virus had hit an Indiana turkey farm, alerting other states to the danger and putting workers who might have been exposed to the virus under surveillance.

Last year's outbreak led to the deaths of more than 48 million chickens and turkeys, either killed by the virus or culled to contain it. No cases were reported in humans.

Strains similar to the new virus, known as H7N8, have on rare occasions made people ill and the U.S. Department of Agriculture, U.S. Centers for Disease Control and Prevention and state officials aim to reduce the risk of human infection.

They also want to blunt the impact on the poultry industry, which suffered billions of dollars in losses in last year's outbreak. Egg supplies shrank and prices surged to record highs.

"We are hopeful that as we respond very quickly to this virus that we can get it contained and hopefully not see an extensive outbreak like we did last year," said T.J. Myers, an associate deputy administrator for the USDA's Animal and Plant Health Inspection Service.

Even if the response is fast, the government's ability

The new strain found in the United States is considered highly pathogenic, meaning it is especially deadly to poultry

ty to contain the disease is far from certain. Officials have never dealt with this strain before, and wild birds are thought to spread the disease to farms through feces dropped from the air, making infections difficult to prevent.

U.S. officials have taken to heart lessons from last year's outbreak, when USDA workers could not always kill infected flocks fast enough to contain the virus. Workers are now trying to cull sick flocks within 24 hours of diagnoses, following a goal the agency set in the autumn.

Most turkeys at the infected farm were killed within a day, but it was 29 hours before all were dead, said Denise Derrer, spokeswoman for the Indiana State Board of Animal Health.

No human infections associated with the new strain have been reported, according to the USDA.

Especially deadly to poultry

Still, people who interacted with infected turkeys were quickly placed under a new monitoring plan developed in response to last year's outbreak, Michael Jhung, a medical officer at the CDC, told Reuters. The agency also plans to conduct lab tests and animal studies of the virus.

Similar H7 viruses — which share the same surface proteins — have caused problems in people ranging from mild, flu-like symptoms to serious respiratory illness, Jhung said.

"We know very little about this particular virus because we haven't seen it, but we want to take as many precautions as we can to prevent any human infections," he said.

There is always uncertainty around any new strain of influenza because the virus acquires mutations passing from host to host.

The Indiana flock appears to have become infected when a less dangerous form of the virus in the area mutated, said John Clifford, the USDA's chief veterinarian.

Limited genetic data from preliminary diagnostic tests last week showed this H7N8 virus originated from North America, while last year's strains had roots in Europe and Asia, government officials said.

North American viruses have typically posed less of a threat to humans than viruses from the Asian Avian H5N1 lineage, said Carol Cardona, an avian flu expert at the University of Minnesota.

Viruses in the H5N1 lineage "are super bad guys," Cardona said. Still, outbreaks of North American viruses in Pennsylvania in 1983 and British Columbia in 2000 were "devastating and difficult" for poultry, she added.

The new strain found in the United States, like these previous viruses, is considered highly pathogenic, meaning it is especially deadly to poultry.

Mobilizing personnel equipment

In Indiana, the USDA quickly deployed personnel and equipment to assist the state with culling birds and testing nearby flocks, said Bret Marsh, Indiana's state veterinarian.

Marsh alerted other states about the new virus outbreak on an emergency conference call in the early hours on Friday.

"We realize that if it's indeed of wild bird origin, they know no boundaries so we want to make sure that everyone is properly informed," Marsh told reporters.

Bird flu cost the U.S. poultry industry an estimated \$3.3 billion in 2015 as farmers had to destroy infected flocks and halt production for months. Importers also cut back on trade in the \$5.7 billion poultry and egg export market, and some have already limited shipments because of this new outbreak.

U.S. negotiators have worked with trading partners in the past year to focus restrictions on infected counties or states, instead of blocking shipments from the entire country, said Toby Moore, spokesman for the USA Poultry & Egg Export Council. That could minimize the economic burden of outbreaks.

Farmers also have strengthened cleaning and security practices in a bid to keep out the virus, with many requiring workers to change their shoes before entering barns and barring delivery trucks from getting too close to poultry houses.

"In the poultry business, there's a positive determination that this new strain not have any chance at proving what it might be able to do," said Keith Williams, a spokesman for the National Turkey Federation, a trade group.

Limiting infants to almond milk can lead to scurvy

BY KATHRYN DOYLE
REUTERS

Plant-based beverages such as almond milk can't be used to replace breast milk or infant formula, a new report warns.

The authors of the report describe an infant in Spain who was fed only almond beverages or almond flour-based formulations from age two months to 11 months and developed fractures and failure to thrive due to scurvy.

Scurvy is a serious condition caused by lack of vitamin C in the diet. Once the scourge of sailors who did not have access to sources of vitamin C during many months at sea, scurvy is rare today.

Dr. Isidro Vitoria of the Hospital Universitario y Politécnico La Fe in Valencia, Spain, and coauthors report the case of a male baby who was born at term, vaccinated according to Spanish guidelines, and fed with a cow's milk based formula for the first two and a half months of life.

When he developed skin inflammation, a medical doctor recommended he be switched to daily intake of a prepared mixture including almond drink, almond flour, sesame powder, brown rice malt, brown rice, millet and a sachet of probiotics and prebiotics marketed in Spain.

From age six months onward, his mother offered him pureed fruits and vegetables that he would not eat.

At 11 months of age, the baby was tired, irritable, had failed to thrive and refused to support his legs on a solid surface, crying even when an

adult moved his legs for him. He had abnormal levels of zinc, vitamin D, thyroid stimulating hormone and ascorbic acid, or vitamin C.

X-rays revealed fractures in his legs and back and thinning bones. The almond formula was stopped and replaced with infant formula, cereals, meat, fruits and vegetables supplemented with vitamin C and D replacement therapy. One month later his x-rays had improved. Soon afterward, his vitamin C and D levels had normalized.

Two months after stopping the almond formula he started walking, the authors reported in Pediatrics. In the first year of life, babies should consume 50 to 60 milligrams of vitamin C every day, the authors say. On average, 8 ounces of breast milk contains about 11 milligrams of vitamin C. Infant formulas should contain 10 to 30 milligrams per 100 calorie serving, the authors write.

The American Academy of Pediatrics recommends that infants be exclusively breastfed for about the first six months of life, and then solid foods can be introduced.

Fruits like oranges, strawberries and kiwis are also good sources of vitamin C. When almond beverages are processed, some vitamins, including vitamin C, lose their biological activity, the authors note. Although some such beverages in Spain are fortified with vitamins and nutrients, the particular formula this baby received was deficient in vitamin C, D, calcium, iron and zinc.

Current price levels are also sending a signal to producers to transition to cocoa. Coffee futures fell 24 percent in 2015 to around \$1.20 a pound, while cocoa futures have risen for four consecutive years to trade around \$3,000 a tonne, or \$1.36 a pound.

Growing consumer demand for higher-quality products in both markets is also driving the shift, and coffee premiums tend to increase with altitude.

"The lower-altitude coffee does not have the quality level that is now being demanded by the market, so the income these farmers are getting is lower," Gilberto Amaya of Catholic Relief Services in El Salvador said.

But those altitudes are suitable for higher-quality criollo cocoa, which is sought after by craft chocolate makers.

Efforts in the region are focused on promoting quality rather than volume, so while Hershey and Nestle may not be using the beans any time soon, Central America may soon supplement the Dominican Republic and Madagascar as a source of beans for the burgeoning craft chocolate industry.