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**Sweet**

**SOLUTIONS**

**The world has a chocolate problem. People are working to solve it.**

Last year, Americans spent more than \$22 billion on chocolate. But the tasty treat comes at a far greater cost than this.

That's because farmers in Africa and South America often cut down trees in the rain forest when they need more land to plant cacao (kah-kow) trees. This contributes to climate change, or the gradual warming of the planet. In turn, climate change negatively affects the cacao crop. This cycle is putting chocolate at risk. Now experts are developing solutions to help ensure its future.

**TROUBLE FOR COCOA**

Chocolate comes mainly from the Cocoa Belt, a narrow strip of land along the equator. This is also where much of the world's tropical rain forest is located. In the Cocoa Belt, conditions are perfect for growing cacao trees. They need hot, humid, rainy weather.

But in recent years, climate change has affected weather patterns in the Cocoa Belt. As a result, most cacao trees are producing fewer cacao pods. Plus, each pod has fewer beans. The cocoa they produce is of lower quality, which means you need more of it to make chocolate taste, well, chocolatey. Climate change has also led to the spread of disease and pests that harm the trees.

ILLUSTRATION BY STEPHEN BLUE FOR TIME FOR KIDS

**MAKING CHOCOLATE**

A farmer opens cacao pods on a farm in the Democratic Republic of the Congo.

In 2013, researchers studied the changing conditions in the Cocoa Belt. They concluded that by the year 2050, it will be harder to grow cacao in 90% of places where it is now planted.

Some people thought chocolate was destined for extinction. But Christian Bunn, of the International Center for Tropical Agriculture, says chocolate won't disappear anytime soon. Plans to protect it are already taking shape.

**SAVING CHOCOLATE**

One solution to the problem is cross-breeding. By combining two breeds of cacao trees, scientists are developing trees that stand up to drought and disease. Some even produce more cacao pods per tree.

Weather stations will also help. Groups like the Trans-African Hydro-Meteorological Observatory are building them in Africa, where 70% of the world's cacao is grown. Information provided by the stations will help farmers know when to plant and fertilize their trees. That's a change from traditional methods. "Years back, farmers would follow farming rules that go with the seasons," Bunn told TFK. "Those rules don't always apply anymore."

An app called CocoaLink also helps farmers. Released in 2011 by the World Cocoa Foundation (WCF), it sends messages to farmers in Ghana with tips on how to grow trees more efficiently.

Together, these fixes could help farmers grow more cacao on less land, ending the push to clear rain forest. That's good for chocolate, and a sweet deal for the planet. "You don't get something from nothing," WCF's Ethan Budiansky told TFK. "Everything has an impact, and we have to be smarter about our food, going into the future."

—By Shay Maunz

**FARM TO CANDY**

**Where does chocolate come from?** Here, we walk through the making of a candy bar, beginning with a cacao tree growing in the Cocoa Belt.

But first, let's talk about two words we're using throughout this story: *cocoa* and *cacao*.

The powder used to make chocolate is called cocoa. The seed pods that are ground up to create that powder are called cacao. It's also the word used for the trees that grow the pods. They're called cacao trees.

**1 Cacao is grown on trees.** Cacao pods grow on a cacao tree, usually somewhere in the Cocoa Belt, which runs along the equator. The first photo shows them in different phases of ripeness. When the pods are ripe, they're picked by a farmer.

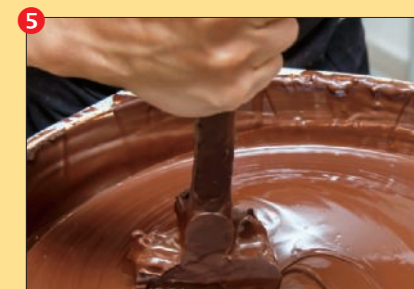
**2 The beans are separated from the pods.** The vast majority of cacao is farmed by small producers in remote parts of the world. Machines can damage cacao trees, so most of the work is done by hand.

**3 The beans are fermented.** Now the beans undergo a chemical process called fermentation. This brings out their chocolatey flavor.

**4 The beans are dried.** Often, farmers simply spread the beans on large trays and let them dry in the sun. Once dry, the beans are packed into bags and shipped to chocolate manufacturers.

**5 Chocolate is made.** In manufacturing facilities, cocoa beans are roasted, heated, melted, and blended with sugar and milk. This takes away their naturally bitter flavor. Then the liquid chocolate is poured into molds and prepared for sale.

**6 Enjoy!** This is the moment you've been waiting for. Take a bite!



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