Swell AI Transcript: EIT Food_ SwissDeCode_ Rapid Testing Chocolate.mp3

Matt Eastland:
Hi everyone, I'm Matt Eastland. Welcome to one of our special docu-episodes. In these explorative deep dives, we tackle the big questions within the food system, uncovering fascinating stories of innovation and change. Time to further explore the groundbreaking ideas and incredible people driving the future of food.

Connor Morrin:
Rich, smooth and universally adored, chocolate is a small luxury with a big role in our lives.

Gianpaolo Rando:
My first memory about chocolate as an Italian, we had this ice cream in the summer, which is wrapped in chocolate. And I remember going on the seaside and asking my mother, when is the 4 p.m.? 4 p.m. is the time you're allowed to get your sweets. And having this chocolate and the ice cream together was, yeah, a great memory.

Connor Morrin:
But what if the source of this beloved treat, the cocoa plant, faced an existential crisis? What if the chocolate we loved could, one day, disappear from our shelves? The world's love affair with chocolate is under threat. And the culprit? A roofless virus called Cocoa Swollen Shoot Disease, or CSSVD, which has decimated millions of hectares of cocoa trees in West Africa. threatening both our chocolate supply and the livelihoods of farmers who rely on it.

Gianpaolo Rando:
This could imply that we will not see chocolate for Christmas.

Connor Morrin:
In a world where traditional farming practices struggle to keep pace, could rapid testing be the lifeline that Kokoa desperately needs?

Gianpaolo Rando:
Hello, my name is Gianpaolo Rando. I'm the CEO and co-founder of Swisticode, a company based in Switzerland. We are helping farmers and food manufacturers to grow high quality sustainable food.

Connor Morrin:
Gianpaolo shares how Swisticode's rapid testing technology is not only making early disease detection possible, but might be the game changer that allows cocoa to thrive despite rising environmental

threats.

Gianpaolo Rando:
I don't know if you ever see one cocoa plant. I turned 40 before ever seeing one. Cocoa trees are a very picky plant, to be honest. They are a small plant, maybe 2-3 meters high, and they are very picky in terms of what environment they like to grow and having fruits. This is both in terms of temperature, in terms of humidity, But also in terms of sun exposure, they don't like really sun and they like to be in the shadow. And this is already a challenge when you are thinking about production, you're thinking about plants that need photosynthesis to produce, and you have a plant that is a bit shy, introverted plant that doesn't like to be exposed to the sunlight. There are other challenges around the pollination. The cocoa flowers are very small. So there are only a few insects that are actually able to get inside the flower and pollinate and transform the flower into the fruit. Because of these challenges, today in the world, cocoa can grow only on a small, narrow belt around the equatorial line. This is in West Africa, Ivory Coast and Ghana. And climate change is now changing. And these cocoa trees are getting more vulnerable to diseases. And because they are already picky, plus the diseases are getting there, it is now the fourth consecutive year where the cocoa production worldwide is going down. Demand is going up. If you think about cocoa prices in the last 10 years, the average price per one ton of cocoa beans was around 2 to 3 thousand euro per ton. Last year, 2023, the price closed at around 4,000. This year, at the moment we are speaking now, the price is oscillating between 10,000 to 7,500. It's reaching a price tag which is typical of metals, like copper. And who will think that when you buy cocoa, you are buying something that is as precious as a metal? That's what's happening today. The disease we are talking is called Cocoa Swollen Shoot Viral Disease, CSSVD. It's a long name, but it's essentially COVID for the cocoa tree. We could even say this is the ebola of the cocoa tree, because there is no remission. Once the cocoa tree is infected, in a couple of years it's going to die. There is no way the cocoa is getting back into a healthy status. It is a virus. Like any virus, the virus is hijacking the cells of the plant, in this case, and is diverting the metabolism of the plant instead of producing cocoa fruits to produce more virus. That's the way it works. As any other virus, it's an infectious agent. So you have small insects called mealybugs that are landing on a leaf of the cocoa tree. They are eating the leaf, and they're getting the virus with them. And when they're flying and they're moving into another coconut tree, by eating the leaf, they're actually injecting the virus into the other plant. And that makes so that the virus is propagating and the disease is propagating as well. The magnitude of this disease today is quite huge. The latest estimate, we have more than one million hectare that have been wiped out. because of the diseases. So this is one million hectare of cocoa land that is now destroyed and is not producing. How much is this one million hectare? You can think about 1.4 million soccer fields. Or to stay on the agriculture, this would be more or less the size of the agricultural land of a major European country like Netherlands. So,

of course, there is more land that is producing cocoa, but we have a deficit of one million hectares that are gone. The risk, if we are not getting this disease under control, is more pervasive than only cocoa production. Think more about the human mankind. We have millions of families that today rely on cocoa production as the main source of income. And in this one million hectares lost, we are talking about millions of families that are not getting their basic living income from cocoa today. And they will need to rethink and change their strategies to find a way to sustain their life, to win their bread. Cocoa is also one of the players of bilateral agreements between other countries. So if European countries cannot import cocoa, Bilateral agreements are going in two ways. It also means from the European industry that we will not be able then to export our technologies or our services to these countries because the market goes in two ways. We are losing on a sweet note about chocolate, but the implication could be more severe. When you think about diseases, there are many solutions that came up to solve the problem of disease. I will use COVID because it's in everyone's mind. First reaction about when you have a viral disease is to run away. In the past, when the farmers were observing the disease, they would run away. That means running away from a farm that is infected. taking more land from the rainforest, cutting the trees and planting cocoa trees instead in an area where supposedly there is no disease. Now, in Europe, there is a new law coming up that will be effective in December this year. It's called the EUDR, European Deforestation Regulation. And what this law tells the industry is that it's not possible anymore to import cocoa from areas that are in active deforestation. So running away and getting more land is not possible anymore. We have the one million hectare lost of cocoa that we need to find a way to remediate and put into a plantation because we cannot take more virgin rainforest today. A second solution, and you will love about that, is about social distancing. You know, with COVID we had to stay far away one to each other. That should apply to trees as well. How do you make distance between trees? You can do that, but in a way that means having less production because you will have less trees in an hectare, for example. There are some good, promising work working on so-called agroforestry systems, where you have multiple trees together and the farmer is taking the crop of cocoa and is selling it, but is also harvesting other crops, providing different sources of income. Agricultural agroforestry is promising, and even though today is a minority of the of the land is converted into this system. In the future, we will observe more of these systems that are more respectful to nature as well. Another solution that was implemented during COVID, wearing masks as a barrier. And if you think about what is the equivalent of a mask in a cocoa plantation, there are actually some trees that can act as a barrier. For example, it has been observed that coffee trees are an effective barrier against the disease. What's happening is you have the insect that is carrying the virus, posing on a leaf from the coffee tree, is eating the leaf of the coffee instead of the leaf of the cocoa tree. And the virus cannot grow into the coffee. So the virus is getting lost. It's like if the insect is washing his hands, is washing his mouth, right? And the virus stays into the coffee and eventually dies there. And when

the insect is moving and is going into the cocoa tree, it's clean. So this is a vegetal barrier. Now all these solutions about land remediation, about putting in place new agroforestry systems, about creating barriers for protection of the virus, in a way or the other rely on the capacity to measure the efficacy of these systems. Let's just make a simple example. We spoke about coffee as a barrier, but how wide the barrier should be? We're talking about one meter, we're talking about 10 meters. What is effective and how do you know that is effective? You need to measure, right? If you don't measure, you don't manage. Measuring during COVID was done by PCR testing. With PCR you are able to identify the viral DNA and tell persons that are infected, you can even tell when they are asymptomatic, so you are not coughing, but you are covering the virus. The same is for trees. You can eventually do PCR on trees. You're taking the leaf and you do the PCR, and you will see if the virus is present or not, and you can have a general map of where the virus is at the moment. This you can get with the satellite as well, but with the satellite you can only see the symptoms, you can only see the tree that is dying. But there is a long latent asymptomatic phase, more than two years old, where the plant, the trees are propagating the disease, but they're not showing symptoms. So that's why you need PCR testing. Problem is, we are talking about Ecuador. We are talking about land where there are no roads. There is no cold chain. There is no way you can take a PCR test and run it at scale into these countries. That's also why this country suffered so much for COVID. And if people suffer from COVID, Cocoa trees, I mean, it's an order of priorities. They're going to suffer even more. This is where Swissdecode provide new solutions to measure and manage the disease and the agricultural chain of tropical areas. Cosa Swiss decoded by helping farmers and food manufacturers to grow high quality sustainable foods by providing the first mile testing, inspection and certification schemes using a new technology, a technology that is allowing to measure the presence of the disease via DNA testing, but in a way that is conducible to those countries. We simplified the test in a way that can be done by a person with minimal training, We simplified the equipment in a way that can be carried in a 4x4 car or even on a motorbike, which is the typical locomotion mode of traveling inside the plantations. And we simplified the results and the user experience so that the results can actually be obtained into this country with a relatively simple manufacturing process as well. And last but not least, we removed the need for cold chain. So there is no need to bring consumables and to bring reactive into frozen status, which is what's happening today for the PCR test. But we now validated in both countries, Ivory Coast and Ghana, that the kit survives the temperature, humidity of these tropical countries. When we think about impacts, I believe that we are providing support at many levels. Something that I have seen in the last months is we are a bit of a catalyser for the cocoa industry to come together. If in the last years every trader and every co-co-manufacturer would consider the other players as competitors, today we are in a state of emergency where everybody is trying to help each other. And having a test that can be done by different players and having the test data shared among players helps to have the full picture of the disease today. Now, we cannot tackle the problem alone, but if as an

industry we are coming together, and this is happening now where we have, for example, a project which we are doing together with Mars, together with Mondelez, together with the Swiss Sustainability Cocoa Association, together with some other European chocolate players like Stork in Germany, And instead of being competitors, we are all sharing data about these test results. And this allows us to have the best picture of the disease and then finding the best way to intervene. In the future, we are working pre-competitively with all these major players, putting together all their collections, all their genetic collections. clean this collection from viruses and then see which one of these variants, we're talking about more than 1,000 variants, more than 1,000 different genetic cocoa varieties are A, resisting better to the disease and be producing in a good way into those countries. Because we have this one million hectares that we have to re-put into production. We cannot cut more virgin forests. And it's better if we find the right varieties and the right protocols to make it happen. So the test is a way to verify that the tree is responding well or not so well to the virus and is giving an early alert about the virus presence. But the test itself is only a tool and working together as an industry, bringing new tools is the way forward. Working together, collaborating together.

Matt Eastland:
This has been the Food Fight podcast. As ever, if you'd like to find out more about what we do, head over to the EIT Food website at www.eitfood.eu. Also, please join the conversation via the hashtag EIT Food Fight on our X channel at EIT Food. And if you haven't already, please hit the subscribe button so you never miss an episode.