

# Climate Impacts on Sugar – CSA Booster

## Summary

Climate change is increasing the risk of disruption to global food supply chains. A warming climate is likely to increase extreme weather events, such as floods and droughts, according to the Intergovernmental Panel on Climate Change (IPCC). These shocks can be detrimental to supply and price as well as the livelihoods of producers. In a piece of research funded by Climate-KIC's Climate Smart Agriculture (CSA) Booster Flagship Programme, climate fintech firm Carbon Delta and the Potsdam Institute for Climate Impact Research are using crop yield data and weather modelling to quantify the risks posed by climate change to specific parts of the supply chain of a major chocolate producer. This is one of a number of CSA Booster projects addressing issues in the food supply chain.

## Key Points

- The risks to food supply chains posed by climate change are increasing
- Their impact can have a knock-on effect
- The Potsdam Institute for Climate Impact Research, together with Carbon Delta, is investigating climate change risks to the sugar and coconut supply chain of a major chocolate producer
- The company plans to use the research to mitigate against these risks in future
- This will benefit more than just the firm's bottom line: it will help ensure the land on which these commodities are grown is farmed more sustainably

## Project Background and Drivers

Climate change impacts pose an increasing set of risks to food supply chains. Being able to quantify these risks before they materialise means businesses can take measures to protect themselves and their suppliers rather than simply respond to events. While you can't stop flooding or heatwaves from happening, the best way to mitigate their effects is to literally start from the ground up.

Educating small-scale producers about these risks, and giving them the knowledge and tools with which to better farm their land, plays a large part in this mitigation. That's good news for businesses and good news for the farmers whose incomes depend on the quantities they are able to produce. It can also strengthen food security and reduce pressure on global food production when disaster strikes.

## Project Detail

Carbon Delta is a financial technology firm based in Zürich that analyses and evaluates the climate resilience of companies and their assets.

While climate change is acknowledged as a major global risk, most companies and research organisations are still not prepared, even though the capabilities exist to make risk calculations, says David Lunsford, Carbon Delta's head of development and co-founder. "We have developed a quantitative model that helps companies and banks understand what risks they could be confronted with over the next 15 years."





Earlier this year, Carbon Delta together with the Potsdam Institute for Climate Impact Research, began a project to examine parts of the supply chain of one of the world's biggest chocolate producers. "We are examining and calculating the risk that the company has in terms of climate change in their supply of key ingredients like sugar and coconut," Lunsford explains. "The firm understands the risk for cocoa very well, but they recognise there are obviously other risks in their agricultural commodities and they want to establish the full risk picture."

## Using Crop Yield Data

The chocolate company has provided the project team with crop yield data from its coconut and sugar producers over the past eight years. "We need to know as much detail as possible," says Lunsford. "The modelling we do is very detailed – a 20km by 20km square matrix – so we need to learn where the farms are located in those countries and how much demand there is in these regions."

That data is currently being integrated into the Potsdam Institute's agricultural climate models. The team hopes to be able to start running its model within the next couple of months, at which point Carbon Delta will begin to identify the most significant climate change risks to these parts of the company's supply chain – from risks to the farms themselves to the greenhouse gas emissions caused by sugar processing plants higher up in the supply chain. The study will also propose ways to mitigate against those risks, from sustainable farming methods to the use of more efficient processing equipment.

Most companies don't respond to climate change risk until after it has had an economic impact, Lunsford says. "If there is a big drought or flood then crops can be wiped out for a season. But if you can predict these events before they happen, it's a whole new perspective on crop-planning and agricultural engagement with farmers," he explains. "Understanding the long-term trend of a country or region being put under pressure by

drought or flooding means you can really understand and manage your supply chain risk rather than simply respond to problems."

These problems can be huge. In the summer of 2010, Russia's wheat crops incurred a loss of 59 percent of its estimated economic value due to a heat wave. A loss of approximately €4.13 billion was incurred by Russian farmers.

A big contributor to mitigating against these risks will involve educating the suppliers. It's a win/win for both the buyer and the grower. The former can smooth out risks and any volatility in its supply chain caused by climate-related factors, while the growers' income is similarly protected.

"If you educate farmers about how to enhance nutrients in their soil, for example, then a small decrease in the water supply may not have such an impact on the growth of crops," says Lunsford. "There are also better tillage methods they can implement, and there are fertilisers you can use to help protect your agriculture."

There is a social benefit here, too. Sugar cane farmers in the developing world live on low incomes, and as such are vulnerable to even small hits to the quantities they are able to sell. Improved land stewardship and better farming practices can help maintain their livelihoods.

Elsewhere in the supply chain, meanwhile, levels of greenhouse gas emissions – for sugar processing plants, for example – pose another climate risk. The study will also look at whether cleaner production processes can be implemented in those regions.

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## Climate-KIC Support

Carbon Delta and the Potsdam Institute formulated the project in the first instance and submitted it to Climate-KIC's CSA Booster Flagship programme in response to a call for proposals in August 2016. It's a one-year project, due for completion in summer 2017. Carbon Delta's participation in the programme has brought more benefits than just the funding, Lunsford says.

"One of the really nice things Climate-KIC does, at least for the CSA Booster, is they have meetings every three or six months and you get to sit with other participants and hear about each other's projects," he says. "They do a good job in keeping everyone focused and creating an atmosphere where people doing research on agricultural issues and climate change can learn from each other."

## What's Next?

Currently, the team is working the data into the Potsdam Institute's agricultural model. It hopes to have the model up and running within the next couple of months, after which the partners can start to identify risks in the client's sugar and coconut supply chains.

The project will finish around summertime next year, but its implications could be felt for a long time after that. "We are delivering a very valuable piece of research that will inform decision-making and will be the basis for further action in the future," Lunsford says. "We are modelling out to 50 years into future. This would give the company foresight for quite a long time."

## About Climate-KIC

Climate-KIC is the EU's largest public private partnership addressing climate change through innovation to build a zero carbon economy. We address climate change across four priority themes: urban areas, land use, production systems, climate metrics and finance. Education is at the heart of these themes to inspire and empower the next generation of climate leaders. We run programmes for students, start-ups and innovators across Europe via centres in major cities, convening a community of the best people and organisations. Our approach starts with improving the way people live in cities. Our focus on industry creates the products required for a better living environment, and we look to optimise land use to produce the food people need. Climate-KIC is supported by the European Institute of Innovation and Technology (EIT), a body of the European Union.

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