Alex 0:00
Hi and welcome to Seeing Climate Change, the podcast that explores climate change through visual art, personal reflection, science and conversation. I'm Alex and as always, I'm joined by my co-host Hannah.

Hannah 0:27
In this episode, inspired by the William Benton Museum of Art's Seeing Climate Change exhibition, Natalie Bolte talks with UConn's own, Dr Elias Uddin, about how to make cows a little more environmentally friendly. Let's join them.

Natalie 0:50
Hi everyone. My name is Natalie Bolt and I'm an undergraduate digital media and design major here at UConn. Imagine it's a warm summer day and you just ordered a scoop of husky tracks on a cone. The friendly chatter of other customers and fun photo stand of UConn's beloved mascot, Jonathan the Husky makes the UConn Dairy Bar not just a place to satisfy your sweet tooth, but also a haven where the stresses of the academic day disappear with each bite of indulgent ice cream. I'm sure that every student here at UConn has tried the infamous Dairy Bar ice cream, or seen the cows roaming around on Horse Barn Hill. 2s Some might even know about the Kellogg Dairy Center, a student and faculty run facility where both milk production and research by students and faculty occur on a wide range of topics. However, did you know that the cows behind your beloved Toasted Almond, Amaretto and Salted Caramel Crunch Ice cream are one of the top 20 herds in the country for animal health and milk quality? These cattle are pretty special. As one of the only two university cattle herds to make the hordes list, and these content cows can be found grooming themselves with a brush adorned barn doors or running around on the fields. Today I will be joined by Dr Elias Uddin, an assistant professor here at the University of Connecticut, who was kind enough to tell us about his research here in the area of greenhouse gas mitigation strategies.

Dr Elias Uddin 2:15
Um, well, uh, my name is Elias Uddin. I'm an assistant professor at UConn's Animal Science Department, and I started at UConn in fall 2023, so very recently. But before that, I was a faculty member at a different institute. So I moved from somewhere. And uh, before that, I did a postdoc at University of California, Davis and did my PhD in Wisconsin medicine. Uh, so during my grad school and postdoc, I mostly focuses on, um, evaluating different greenhouse gas mitigation strategies research. And um, before that, I was in Europe for doing my master's, and I did my undergrad back home in Bangladesh. So I'm originally from Bangladesh, and I grew up in a in a crop livestock integrated farms. That's how I got interested in animals, uh, seeing animals during my childhood.

Natalie 3:09
Throughout the world, dairy cattle contribute around 2% of global warming emissions through enteric, meaning intestinal and waste fermentation. Cows are ruminants, signified by the four chambers to their stomachs. The rumen, which is the first chamber, is home to a complex ecosystem of microorganisms, and it's where enteric fermentation takes place as the bacteria

are broken down into carbohydrates. Through this process, harmful gasses such as carbon dioxide and methane are produced, and these harmful gasses make their way out of the cow and into the atmosphere.

Dr Elias Uddin 3:42
Uh, there are a couple of strategies. Before going into strategy, I just wanted to make sure that entry commission is a part of the mission that comes from the animal stomach, right? Also, you have to understand that, um, entry commission is, um, coming from the ruminants mostly. So ruminant has a, uh, the stomach that has a lot of microbes. And those microbes are produces, um, methane during fermentation of forages. So ruminants uniquely can convert prairies into forays into high quality milk. And during this process, they produce a methane that is, um, responsible for climate change. But you have to also remember that, um, overall, dairy sector only produces 2% of the total US greenhouse gas emissions. So it's not like, uh, damaging the whole planet. It's only 2%, uh, emission comes from dairy industry. In terms of mitigation strategies, um, we have three different categories of strategies. For example, you can have a better feeding strategies for the animals. And there are a couple of chemical compound. Um, you will be surprised that seaweed, um, has shown that is one of the potential strategy. So feeding seaweed can help to reduce enteric methane as well. Um, other than that, um, better quality feed and feeding more grains can help to reduce enteric methane. Um, better genetics of the animals. That means better, uh, efficient animals means less methane. Um, uh, in other words, you can also reduce, uh, less productive animals or deceased animals from the heart. In that way, you can improve efficiency. And that will help you to reduce, um, uh, emissions. So there should be multiple strategies. There is no single, uh, solution or there's no silver bullet for reducing enteric methane.

I also want to mention that we have been involved in a project where we are collecting data from the animals, because we are moving towards more data driven industry, right? So we try to utilize those data to improve the management decision so we can improve the efficiency of the animals. So that will help to reduce carbon footprint as well. So once you feed cows certain diet right your goal is to reduce methane from the cows. But that can also result in decrease or increase in manure emission because your manure composition might change at the same time when you change diet. Uh, for example, if you feed more grain, you have to produce more grain in the crop field, right? So crop related emission changes. So holistic lifecycle assessment takes into account of all sources of emission throughout the whole value chain of the milk. So feed production related emission and emission that is enteric methane manure emission. And as well as we have to run the the farm right with the electricity and other fossil fuel. So those are also accounted um, so holistic lifecycle assessment basically account for all the emission sources and do the holistic evaluation. In that way you can determine the the carbon footprint of milk and other products for the beef. It could be the meat.

Natalie 7:06
As Dr Uddin mentioned, there are many factors that can lead to changes in enteric fermentation and therefore an increase in global gasses emitted from the cattle. One of these factors includes the type and amount of methane producing bacteria found in a cow stomach,

and this is related to its genetic makeup. Studies have shown that scientists may be able to breed cows that have less of these bacteria in their stomach, leading to the birth of genetically modified cows that produce less methane. The Kellogg Dairy Center here at UConn is a great example of how research and care can benefit cow health, as well as reducing the production of harmful gasses. The cows live openly in the barn and have lots of field space to roam. Their specialized diet consists of total mixed ration, which is mixed onsite and consists of UConn produced cornmeal, canola meal, sodium bicarbonate, alfalfa hay, and room and bypass fat. This helps keep weight on the cows during peak lactation to ensure good milk quality, and they also incorporate a custom blend of additional protein, vitamins, and minerals for the cows overall health.

Dr Elias Uddin 8:13
The dairy industry in the US has set a goal to reduce carbon to make the industry carbon neutral by 2050. Uh, that means our all of our efforts will help to do that. And other things that I just wanted to mention that although we are contributing to improve our system, more sustainable, but just overall agriculture sector only produces 10% of the total greenhouse gasses and dairy sector produces only 2% of it. Right. So we can make so little changes. But we also have to think about big sector like transportation sector, electricity sector, who is contributing together roughly 50% of the total greenhouse gasses. So we can make a huge difference by making changes in those areas as well. Uh, and but obviously our, our, our effort will help to reduce um, footprint at the end of the, the, the it will help to reduce greenhouse gas emissions.

Natalie 9:10
A great point that Dr Uddin brought up is that although dairy cattle do make a contribution to greenhouse gas emissions, their part is quite small in the grand scheme of climate change. And steps are being made by researchers just like him in order to create a more sustainable future for agriculture. So the next time that you indulge in a scoop of ice cream from the UConn Dairy Bar. Rest assured that it's not only a sweet treat for your taste buds, but a product of care and dedication that goes into both the cows' well-being and educational mission of places like the Kellogg Dairy Centre's research on encouraging positive changes in the industry. What is your favorite flavor of ice cream at the Dairy Bar?

Dr Elias Uddin 9:53
So as I mentioned, I have been in this UConn Dairy Bar a couple of times with some guests and visitors, and they have plenty of options. But literally I always go with the vanilla because vanilla is my favorite ice cream. But at South Dakota State they also had an ice cream bar. I used to try the cream and cookies, so that was also my favorite.

Natalie 10:18
And finally, what is the funniest thing that you've seen a cow do?

Dr Elias Uddin 10:23

The tongue twisting of the Jersey cow. There's also a lot of interest in that. Um, I believe there's a Canadian researcher who did a study. Why do they do that? That's very funny. We have seen that they like, uh, get out of whole tongue and twist it and play with that. That's very unique.

Hannah 10:44
Thank you for listening. Check out the show notes for more information about the topics covered in this episode, and for a link to the William Benton Museum of Art's website.

11:03
The Benton is the official art museum for the state of Connecticut, and admission is always free for all visitors. The museum is located on the University of Connecticut's Stores campus, and is open Tuesday through Friday from 10 a.m. to 4 p.m., and Saturday and Sunday from 1 p.m. to 4 p.m., but make sure to check the website for updated hours before you arrive. We encourage you to visit!

Hannah 11:24
The Seeing Climate Change podcast is a production of the fall 2023 cohort of the digital, Media and Design and History Departments' course, "Collaborating with Cultural Institutions," taught by Professor Clarissa Ceglio. This podcast was produced in collaboration with the William Benton Museum of Art and with the support of WHUS radio. The series theme music was composed and performed by our own Alexander Filippides.

Alex 11:51
Before we sign off, we hope that you will check out the other episodes in this series. Thank you again and see you in the next episode.