iILUminate Blog Transcript: Phil Coles on Redesigning Harvesting Processes

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ANNOUNCER: 00:08	This podcast is brought to you by iILUminate, the Lehigh Business blog. To learn more, please visit us at business.lehigh.edu/news.
STEPHANIE VETO: 00:20	Welcome to iILUminate, the podcast for Lehigh University's College of Business. I'm your host, Stephanie Veto. It's January 9th, 2026, and on today's episode, we're talking with Phillip Coles about his career and recently published paper called Redesigning Harvesting Processes and Improving Working Conditions in Agribusiness. Phil is a teaching associate professor in the Data Department. He also holds an MBA in supply chain management from Lehigh. Hi, Phil. Welcome to the show.
PHIL COLES: 00:49	Hello. How are you?
VETO: 00:50	Good. Thanks. So let's talk about your background. It's really interesting because you have a really versatile resume. Can you talk a little bit about your career before becoming a professor?
COLES: 01:01	Yeah. Well, I jumped around into a lot of different things. And when I was in college, I started as a biology major. I found out it was really hard to get a job in biology, which really scared me. So I started looking into agriculture. And then I narrowed it further into entomology, which for those that don't know, that's a study of insects. And when I took my introductory entomology course, one of the PhD students was my TA, and he was doing all of his research in mushrooms. So I got to see how mushrooms were grown. And it just blew me away. It's really an amazing thing. I mean, I got used to it after doing it for decades. But if you've never seen it, it's absolutely amazing. A very unique type of agriculture. So I said, "I have to do this." And my problem was I grew up in a place that looks very much like Bethlehem. It was called McKeesport, with a steel mill in the bottom with the blast furnaces and everything just like we have in Bethlehem. And I want to be a farmer - right? - growing up by a steel mill in the city.
COLES: 02:10	And so I did an internship at a mushroom farm, and I did very well. And they tried to convince me not to go back to school. And I said, "Nah. I have to get my degree." And they said, "You have a job when you graduate." So that's what I did. And I only worked there for a few months. And then I went to another farm, and I ended up being there for 32 years. So I was very involved in the industry. I did a lot of different positions there. I was in charge of the composting facility. I was in charge of what's called spawning. So spawning is kind of like the equivalent of planting the seeds, right? So the mushrooms don't have seeds, but without going too in depth on it, I was planting the seeds. And then there's another portion of it. We're actually growing the mushrooms themselves, and then we have the harvesting. So I got involved with Kaizen and continuous improvement and very in-depth with operations and increasing efficiencies. So I was a project manager. I was a Kaizen facilitator, very involved with the process.
COLES: 03:20	So at the same time, I went back to school, and that's kind of what eventually led me to teaching. But initially, at work, I started doing trainings. I was doing research on the side. I had a little Quonset hut that I grew mushrooms in. And I was involved with research, and I'd already been publishing. So I kind of knew that I wanted to teach and that I wanted to do research, but it was just kind of like a hobby for me. Worked

with EPA and pesticide issues, USDA with food safety, FDA. Very involved with the American Mushroom Institute, and I still am. And as an entomologist, I became very involved with IPM, which stands for Integrated Pest Management. So I was the head of the Integrated Pest Management Committee. That's how I got involved with the EPA and that sort of thing. And I did some consulting as an entomologist on the side too. So as a mushroom grower, an entomologist, an operations person, I like to say I get bored easy, so I jump from one thing to another, keep things interesting.

VETO: 04:31 And describe what a Kaizen facilitator is.

COLES: 04:36 Okay. So the idea behind Kaizen is exactly what it stands for, right? So kai means change. Zen means good. It's the literal translation, but you interpret that as continuous improvement. And one of the things that's really important is get the people involved. So traditionally, what happened in Western companies is you have the boss. The boss knows everything. And the people on the front lines, they're treated like the proletariat, right? Everybody's heard of that. I don't pay you to think, I pay you to do what you're told. So that's really a bad way to manage people. Everybody has ideas. So the owner of the company that I work for, I always love to quote him on this. He'd say, "When you hire people, you're paying for their hands, but you get their minds for free." And this is the idea behind it. Those are the people that are on the front lines. They see what's happening. They know what's going on. They might not be an engineer or an accountant or a biologist, but they see what's going on. They have great experience. So you pull them in.

COLES: 05:45 And one of the things that's very important that we found were quality circles. And the quality circles gives the people on the front lines the chance to make some decisions. It's almost like a separate set of management, right? So you have the hierarchy with management, with the supervisors and the managers and that sort of thing. But it's the people in the front line that are able to make some of those decisions. So the closer you can have the decision making to the front lines, the better because it's faster, right? So if you ever bought a car and you say, "Well, I'd like you to add in this option." And so I got to check with my manager. That causes delays. You want the people that are on the front line to be able to make as many decisions as possible. So that's the idea behind the quality circle.

COLES: 06:36 So back to your original question, what does the Kaizen facilitator do? Well, there was a lot of quality circles. I would make sure they got whatever they wanted, right? So they're the frontline people. If they're harvesters, they know all about harvesting. If they're the ones working in the composting facility, they know all about the composting and the machinery and that sort of thing. But what they might not be, they might not be an accountant. They might not be-- they probably aren't an accountant, right? They're not fabricators. They're not welders. They're not engineers. So I would make sure that they would get whatever they needed. So for example, when the harvesters were redesigning this piece of equipment we call a hook. And we call it a hook because it hooks on the side of the bed. And that's what holds the baskets that the mushrooms go into. So it's very important to have a good design on this so we could do quick changeovers, right? From like 8 ounce to 12 ounce or 10-pound bulk or whatever the type of packaging it was. So the design was very important.

COLES: 07:33

So they weren't welders. They had ideas how they wanted to be designed. So they needed a welder. They said, "This is what you want to do." These were made out of stainless steel, right? So they have a fabricator that would cut it, a welder that would weld the pieces together. We even brought in an agricultural engineering professor from the University of Delaware, was on sabbatical. So he did his sabbatical. He helped them design. He did CAD and things for the designs that they were coming up. So think about it like somebody's building a house and they're working with the architect. It was the same kind of thing that was going on. When we were looking at cost, I would bring in somebody that was an accountant. So whatever it is that they need, I would make sure they had it.

VETO: 08:22

Do you have an example, perhaps, of the biggest inefficiency or biggest waste that you saw when you went into manufacturing companies?

COLES: 08:31

Yeah. The biggest thing that-- and almost nobody appreciates it is inventory. And when I say inventory, it's not so much the finished product. It's not so much the supplies or the components. It's the work-in-process inventory. And that causes so many problems that people don't realize. So originally, when Mr. Toyota saw this at the Ford Motor Company back in the '50s when Toyota - nobody even knew who they were - was very small. And he went to Ford Motor Company to try to learn, right? Henry Ford, the assembly line, revolutionized the automobile industry. And he saw this work and process inventory that was moving through the system. And they would never stop the line. So if there was a defect, they kept pulling cars off the line, right? Imagine how much space this would take up. So in his mind, he was thinking cash flow, right? He had a finance mind. Cash flow. "I got to get all these parts in the car so I can get my money back." And it sounds crazy now. What are you saying? Ford's rich. Toyota's poor. Can't afford to have all this money tied up in the inventory.

COLES: 09:49

So that's the obvious thing that people think about, is having the money tied up in there. The money's not working for them. It's just sitting there, partially built automobile or whatever it is that you're producing. But what we found was that the real problem comes in is how long it takes to respond to a change in the market. So if people are buying the proverbial blue widgets today and tomorrow they want yellow widgets, you've got all this inventory that you've got to go through a queue, right? It's like people standing in line. So your responsiveness is very slow. The other thing that happens is the quality is really hurt by all this in-process inventory. Because what happens is you're producing stuff in very large lot sizes instead of-- so if I make something and I hand it off to you, and your job is to then-- say I'm making a brake component, and your job is to then put the brake component onto the car. If I make one and I drilled the holes in the wrong place, you can say to me, "I can't put the bolts in to attach it to the car because you drilled the holes in the wrong place," right? So we immediately know that, and we immediately correct it. But now if I made 100,000, and maybe they're $10 a piece, that's a million dollars, right? So now I just gave you a million dollars worth of stuff and you go to put on it and it's no good. What do we do? Right? Are you going to tell the boss? I'm not telling the boss. [laughter] Right? Maybe just stick them on the car with a little bit of-- a little bit of duct tape and let it go down the line and let somebody else find it, right? So they get in trouble instead of you and I get in trouble.

COLES: 11:36

But that goes back to that - right? - getting the line people involved and they can see that kind of stuff, but you don't have that temptation, right? So you had a choice now. You're either going to throw away that million dollars. But who's going to do that? Or you live with those parts not being right, right? So either you hurt your expenses, or you hurt your quality. That's not a trade-off that we want to make, right? So if we just got one $10 part, that's an easy decision. Get rid of that thing. Let's drill the holes in the right place. A million dollars, now we got a big problem. And that's really what the big benefits that come from reducing that inventory. Because when you have all that inventory, you got inventory sitting there waiting for somebody to do something to it. And the other side of it, a lot of times you have people waiting for inventory to come to them. And there's just so much wait, wait, wait, wait, wait. And the hard part is being able to see that waste.

COLES: 12:38

And I tell you, once you get good at it, it becomes a curse because even like you go to fast-food places and you see the things they're doing wrong. And I was at a Sbarro one time, and the guy was doing too big of a lot size, and people were freaking out because they weren't getting their food. And of course, I'm going, "Dude, your lot size is too big." And he's looking at me like I have three heads. But what always happens, right? The supervisor came out - right? - and he saw that the line was backing up, and he starts yelling at him, "Hurry up, hurry up, hurry up." They're like, "Dude, help him," right? "What are you doing? What are you doing?" And so you see that with non-supportive supervisors and problems with large lots. You see it everywhere. The waste is enormous if you can only see it.

VETO: 13:28

I'm excited to talk to you about mushrooms. When we first met, we learned we shared a history of locally foraged mushrooms, which isn't very common. My grandpa used to pick popinkies in the woods in northeastern Pennsylvania. And so we immediately hit it off when we started talking about--

COLES: 13:43

You've missed popinkies.

VETO: 13:45

--mushrooms. You knew exactly what I was talking about. It was incredible because nobody knows what I'm talking about. But you talked a little bit about your mushroom interest and your mushroom past. Can you just give a brief explanation of how you've been able to carry that through your career?

COLES: 14:02

Well, I mean, I was in the mushroom industry, right? So I have a degree in entomology, but I like to joke that it's really a degree in mushroom growing except for there is no such thing, right? I'm not really much of an entomologist. I was interested in growing mushrooms. And so I took a lot of courses in plant pathology and agricultural engineering, everything related to mushrooms. And entomology was a very small major. And the number of people that worked in the mushroom industry or were interested in working in the mushroom industry is very small too, right? So I was at Penn State, 90,000 students. 6 of us were entomology majors. So they lumped us in with the graduate students. And Dr. Schisler, who was one of the greatest mushroom professors ever, he had a small-scale farm there. It was called the Mushroom Test Demonstration Facility. And there's another one that is still there, the Mushroom Research Facility. So I did a lot of one-credit things. So I did one on composting with Dr. Schisler. I did another one in ag engineering, so very specialized mushroom kind of stuff.

COLES: 15:16

So I was really focused on that and learning as much as I possibly could about mushrooms. And then of course, I traveled in Europe and China. And we had a joint venture in India, another joint venture in Mexico. So it was a lot of learning from industry people. We shared information together and that sort of thing. So it's a tight-knit community. There's a mushroom short course every year at Penn State. There's a North American Mushroom Conference. It happens every 18 months. It's in Canada in the summer, and then it alternates into the US somewhere warm in the winter. There's Mushroom Days that I'm planning on going to next year that's in the Netherlands. Netherlands is a very big mushroom-producing region of Europe. Basically, the Netherlands, Ireland, and now Poland more recently. It's been a few decades now, but they're a relative newcomer since the fall of the Iron Curtain. But they've really done well, a lot happening in Poland now.

VETO: 16:28

And you've been able to take this interest and original career with mushrooms and carry it through into your research. Can you talk about a recent study that you just published? It was called Redesigning Harvesting Processes and Improving Working Conditions in Agribusiness. Talk a little bit about what it's about.

COLES: 16:51

I was one of those line people in essence, right? I was talking about in the quality circles, right? So I worked in the industry. And there were things that I saw, and there were questions that drove me crazy. So just to regress for a second. I also published some articles in the Journal of Economic Entomology and in Plant Disease, because there were things that I had seen that I was convinced that I knew what was going on. I had a hypothesis, so I wanted to prove them. And so sticking with that eclectic research and jumping into a lot of different things, this fell into it too. I saw this in operations and harvesting.

COLES: 17:36

In growing, harvesting is by far, not even close, absolute highest cost. So when you look at the costs that are involved in composting, there's a lot of innovations that have happened over the years to make it more efficient. If you look at that, what I refer to as the spawning, it's kind of like planting the seed, all kind of innovations, way more efficient. But harvesting, it's still people that are picking mushrooms. So we're always looking at that process, trying to make it better all the time to improve that efficiency. But just like teaching or a great example I heard the other day. This wasn't my idea. Somebody brought this up and said, "If you look at a string quartet, it's exactly the way it was done 500 years ago is done today. There's no increased efficiencies," right? So you've got popular acts. You can record music, right? So they couldn't do that 200 years ago. You had to actually go see the performer. So they increased their efficiency by recording so we can listen to whatever music we want in our homes. So that's what allowed musicians to make a lot of money, right? 200 years ago, musicians weren't able to make all that much money because it was limited to how many people they could perform for. But when you stick with something like a string quartet, the same way. Well, that's where we are in harvesting. It's still people picking mushrooms. It's something that hasn't been able to be effectively mechanized. So it's very, very expensive. So how do we make people more efficient? And that's what we wanted to focus on. We struggled with this forever.

COLES: 19:26

So I actually wrote a case that I haven't published yet on the different types of incentive pay systems, right? So all kind of different schemes came up with to allow them to make more money if they pick faster. Because it really comes down to that,

right? So if I can get a dollar for a pound of mushrooms, right? I'm a little math challenged, so keep nice round numbers here. So if I can get a dollar for a pound of mushrooms, let's say I'm paying somebody $10 an hour. If that person picks nothing, they're costing me $10 and I have no income. If they can pick 10 pounds an hour, I've got $10 coming in. Well, I can pay them, but I can't pay anybody that made the compost, that made the seed, that planted the seed. And again, they don't have seeds, but without going down that wormhole. So they have to pick faster, or you're out of business. It's not going to be worth it. So how do you incentivize? Well, part of that is you can give them incentive pay. So if they pick more, they make more money. Well, but if you let them make all the money, no matter how fast they go, they're still making all the money, right? So let's say I paid them a dollar a pound to pick it. Well, now they're picking 100 pounds an hour. We're still out of business because the harvesters are still getting 100% of the money. So there's another issue that you have, is the mushrooms, as they grow, they become more and more valuable. Because how do you figure out the value? Well, you take the weight of the mushroom, and you multiply it by the price you can get. So as they're growing, they're becoming heavier. They're becoming more valuable. So you don't want to pick them yet until they reach their peak value. The problem is it very suddenly falls off the cliff.

VETO: 21:08 Right. What about the shelf life?

COLES: 21:11 Yeah. Exactly. So if I leave them there too long, right? So let's say I'm getting that dollar a pound. If there's 1 pound, I got a dollar. I let it grow. I got 10 pounds. Now I've got $10. I got 100 pounds. Now I have $100. But then all of a sudden, when they start to open up, and there's no reason not to buy open mushrooms, but the market wants them to be closed. Once they open up, they go from a dollar to 35 cents. So even though the weight is higher, my value has now fallen off a cliff. So what you want to do, theoretically, is you want to sit there and just watch that mushroom, right? It's like Paul Masson wine, no wine before it's time or no mushroom before it's time. And you want it to grow and grow and grow till it's just as peak, it's just ready to open up, and you're going to pull it off.

COLES: 21:57 And the problem is we can't do that because people go into the room and the mushrooms are all at different stages. So they go in there and let's say the mushrooms growing 24 hours, and they roughly double in size every 24 hours. I say roughly. It's not exactly that, but it's an easy way to look at it. So they're growing so fast. You can't see them growing, but boy, it feels like it, right? So what you would theoretically want to do is you'd want to have somebody sitting in there watching for each one to pop up 24 hours a day. But that's not how it works, right? You have a bunch of people. They go into a room. They pick them off. So now what I got to do, I've got some that went too far, and I got to separate those out. I've got some that are at peak value, but I got other ones that are less in peak value. They should be left to grow a few more hours. But I can't allow them to grow another 20-some hours. I say 20-some because it's not actually 24 because maybe I was harvesting for an hour, right? So 23 hours later, they're going to be open. It's going to fall off the cliff. So I got to pick that mushroom before it's ready because tomorrow its value is going to be lower.

COLES: 23:01 So that's traditionally how they harvest. There's this other concept. And what we called it in the paper is different than what we call it in the industry. And that's

because we wanted to use the terminology that people use in-- that would be more relatable in operations because it's not just about harvesting mushrooms. They have a lot of similar problems. Like Amazon, right? They pick. They're not picking mushrooms. They're not picking any kind of agricultural crop, but they're picking items that are going into distribution. So we wanted to make this more applicable in other areas as well. So it goes to the issue of spoilage. There's a lot of things that have spoilage, right? So even dry goods and canned goods have a certain amount of spoilage. It's much longer than if you're dealing with fresh produce or something like that. But everything has some kind of an issue with spoilage. So that's why you see in the paper; there's that variation in how fast it breaks down.

COLES: 24:07

So what we're looking at, these two different types of harvesting. So we call it harvest all together and selective harvesting in the paper. But the mushroom growers call it-- what we're calling selective harvesting, they call it grazing. And so you think of a cow in a pasture. It's grazing and it's picking the grass or whatever it is that it's eating just at the right time, right? So it's moving around. So that's what's happening in the rooms where people have to move around. So the beds that the mushrooms are on, and some use trays, but regardless which one is, they're stationary and the people have to move around. So there's three factors going on there. Is the company making money? Are the people making money? And what are the ergonomics that are involved, right? So if you work harder and faster, it's a little harder on you ergonomically. And I don't want to make it sound like we're hurting people or something, just going for a walk, playing sports, exercising, working, all these work in my-- yeah. My joints. Yeah. [laughter] I'm talking from experience here with my grinding knees and elbows, but your body wears down, right? So we want to look at those three aspects.

COLES: 25:30

So when you look at the harvest together and the selective harvesting, they both have their advantages. And if you blend the two of those together, and then there's other things that are involved. Like how fast does the harvester harvest? So the faster the harvester harvests, the more money the harvester makes, but also the more money the company makes. And you get into fixed costs and variable costs because of the way the bonuses work. And without going too deeply into that, there's limits on both of those. So as they're harvesting faster, now you also have the ergonomic issue also. So what we want to say is, how can you optimize this? How can you optimize company profits and individual profits - right? - maximizing their salary? And keep in mind, this is important to the company too. Because if your people can't make money, they're going to leave. They're not going to stay. So you've got to take care of the people. You've got to take care of the company.

COLES: 26:37

And then another portion of that is the ergonomics involved. So for example, the harvesters, when they pick mushrooms, they're in one place. So when we sit in a car, we get uncomfortable, right? And we want to get out. We want to stretch our legs. Well, it's a similar kind of a thing. And we had looked at you could have people that would take the mushrooms from them and bring them outside so they could pick constantly. We thought, "Well, then they're never going to get a break," right? So you're changing up. You're harvesting and then you're carrying the mushrooms out. Well, it's a similar kind of thing between the two different types of harvesting, where it's all together. So you're picking more stuff, right? You're picking those ones that aren't going to be ready for tomorrow. So you're not moving as much. You're staying

in the same place. Where if you're just picking the ones that are right, and that's why they call it the grazing, like I said. The cow is also walking around while-- it's getting a little bit exercise while it's going around selecting the right grass. Well, that's what's happening. The people have to move more. So it's easier theoretically from an ergonomic standpoint.

COLES: 27:48 And what we're trying to do is optimize what is the ergonomic standpoint from the harvesters making maximum income and the company actually makes money so they can continue to harvest-- I'm sorry, not harvest, continue to employ the harvester. And that's a pet peeve of mine. People like to think that companies don't need to make money. It's like I don't know. Those companies are my 401(k). I like them to make some money so I can retire someday, right? So there's a lot of reasons we got to make money so they can grow to make sure that they continue to employ and all that sort of thing. And that's what we're trying to do, is optimize it. And really excited about this because this is going to have far-reaching implications well outside the mushroom industry because there's a lot of industries that are still reliant on people doing manual work. And the only way you can make it better for the people and be able to pay them more is to make them more productive so that money is available for them.

VETO: 28:59 That was really good. No. Thank you. That was really interesting. And I wanted to see where this would go and how it would value other industries. You're someone who's seen it all and done it all. Do you have one big takeaway from this or a surprise even from the study?

COLES: 29:17 I don't know that I have a surprise other than the complexity of it, right? So this was a really complicated paper. It had so many different things in it. And there's still a whole bunch more that's in there because the growers were actually interested in grazing not from an ergonomic standpoint, right? So when I originally-- luckily, I had really good colleagues that thought of these kind of things. It increases the yield. And whenever you're in any kind of a yield business, it's kind of weird, right? So when you build cars or build televisions or whatever, you take these components and you put them together. A yield business, you kind of make an environment that's really good or not so good. And if you do a good job, you get a lot. And if you do not such a good job, you don't get a whole lot. So it's a weird kind of business that it's really mostly fixed costs. The harvesting is a variable cost. Most things are fixed, all the other inputs. So yield is so, so important. And that's where it originally came from. So we haven't even looked at that yet. So that's one of the areas that we're looking into, is to include that with yield. And the other thing is to maximize what is the best incentive system, right? So we didn't look at that. So we're looking at these two different types of harvesting systems, but it's all the different ways that you can pay them. So that's why I said; that's why I wrote a case about that. So this is typical for a lot of things. To be cliché, we find more questions than we find answers because we find things that we didn't even think about before. It's like, "Holy smoke, we're going to tie all these things together."

VETO: 31:01 Phil, thank you so much for sharing your research and describing it. It was great having you on the show. I can't wait to have you on again to talk more.

COLES: 31:10 Sounds great. Thank you so much.

VETO: 31:12

Okay. Phil, we're back with a little bonus interview here. I didn't want to leave out broccoli because I thought it was really interesting the research that you just published about it. And it's on East Coast broccoli. And basically, new varieties of broccoli have been created to grow better on the East Coast. Despite the quality differences from West Coast broccoli, there's still more demand for something that's locally grown. Can you talk about what you and your coauthors looked into with this project?

COLES: 31:43

In this particular paper, we were looking at the buyers. So I worked with a colleague when I was at Cornell when we were both graduate students on consumer preferences. And we find the consumers really liked locally grown. And I just want to bring up, when we say about quality, I don't mean that California broccoli is better than East Coast broccoli. It's that it looks different, right? So we talk about the quality characteristics, its color, its bead size, that sort of thing. So if you were to just take the varieties that they grow in California and grow them here, you'd get a bouquet of nice little yellow flowers, and it looks really pretty, but nobody would want to eat it. And it has to do with the climate, right? So they'll joke about being the weather forecaster out in California, 75 and sunny today. Tomorrow's 75 and sunny, and the next day is 75 and sunny. And that's great for growing those varieties of broccoli. You get this very nice, even head growth.

COLES: 32:49

But some of the plant breeders were developing broccoli that they were trying to make it look like the broccoli that grows in California because people don't care what food tastes like. They say they do, but they eat with their eyes, right? They had the same problem with mushrooms. Oh, they can't possibly be open. They can't have a little bruise on them. It's the same way. The beads have to be small. They have to be even, all that sort of thing. So they got some really great strains, but they don't look exactly the same. We find that consumers really like them, but the problem was, "Well, will they ever see them? Because what if the buyers won't buy them?" Because the buyers have a bias. So our original research, we showed that the buyers, and this is what I suspected, they would think, "Oh, that's great that it's locally grown." And they like it to be organic. They like the food safety. But at the end of the day, they're not going to pay a dime more for it, and it better be the exact same quality. And it really bothered me that that's what we find in our first paper because it seemed like it shouldn't be that way.

COLES: 33:58

So in this paper that we just published, we changed the experimental design. And the other one, we had photographs of broccoli, and we said-- this was all done via the internet. So here's a picture of broccoli. What do you think of it? And they would give their evaluation of it. And then we said, "Well, what if it was locally grown? Would you like it any better?" And basically, we got the exact same answers to a buyer, every single one of them. So what we did, we went to the New York produce show for this new one, and we took actual broccoli. So we got broccoli that was growing on the East Coast. We got broccoli that was from California. And half the people that saw it, it was broccoli A and broccoli B. Half the people that saw it, it was East Coast broccoli and West Coast broccoli. And what we found was there was a definite preference for the locally grown, right?

COLES: 34:51

So we were in New York, so it was East Coast. There was a definite preference for the locally grown East Coast broccoli. They evaluated all the qualities, the color, that sort

of thing, differently. Being local or not local, they didn't say that, "I liked it better," except for that it was local. So it was a complete standalone preference that we saw from buyers also. So we were very excited that we proved our hypothesis, even though our last paper said our hypothesis wasn't right. But that's what happens in research all the time. It's very frustrating when you get the numbers and you're sure it was going to go this way and it wasn't. And that's why it's important to publish things that didn't go the way you wanted it either. Because guess what? That's the way it is. [laughter] But we suspected that, and that's why we ran that one again.

VETO: 35:48 And do you think from the perspective of the buyer that locally grown is a fad in that they're not going to invest in that? Or do they see it just not coming off the shelves?

COLES: 36:02 Well, I mean, it depends what the consumers want. But it's been around for quite a bit. Organic has not been as popular as it was. There has been some shift to local, but it is very popular. So how long the trend will go? I don't know. But as we get better at it - right? - going back to what we talked about with continuous improvement and having things closer and having too much inventory, it's always better to have your supplier closer for a multitude of reasons. And the biggest one is that when you're shipping it from far away, right? So we think of that ship as a ship and it's moving stuff around, but it's also a floating warehouse. You have all this inventory. So when broccoli gets here from somewhere it's far away - not necessarily California, it could be Mexico, Florida, if you're talking about New York - it takes longer to get here and you've got the shelf life issue, right? So part of the shelf life is being used up while it's in not transportation. So if you can overcome the other advantages that a place like California has - right? - because of the weather and the year-round growing conditions that they have and that sort of thing, then it's always better to have-- no matter what it is, it's not just produce. It's always better to have your supplier closer, all other things being equal.

VETO: 37:34 Are you able to take this research to the buyers and be like, "Look at this, you can still do East Coast broccoli although it looks different?"

COLES: 37:45 That's one of the fantastic things about agriculture. And we're actually looking at some of these things in the College of Businesses, is we have all this research, but what good is it if nobody knows about it, right? So we're always trying to get the word out. But in agriculture, there's something called cooperative extension. And that's the idea behind that, is getting that to the farmers. And so we were working very closely with the farmers also to make sure they had the information and the buyers. And so I presented this research at the New York Produce Show that has hundreds and hundreds and hundreds of buyers and other people in agriculture and the food industry. And it wasn't just me. There's many researchers that are presenting this research to make sure that they get it out there because we want to see it being used. And actually, there was almost no broccoli grown anywhere except for California and a little bit in Arizona. And now it's over $100 million industry on the East Coast. So it's been very successful. The word is definitely out there.

VETO: 38:53 Oh, yeah. For sure. And East Coast is way better anyway. Everything East Coast. Clearly.

COLES: 38:58 There you go. Yes.

VETO: 39:01 Oh, Phil, thank you again for taking your time to be on the show. And I'm glad we got to have another chat about broccoli too.

COLES: 39:07 Absolutely. It's wonderful.

VETO: 39:08 Take care.

COLES: 39:09 You too.

VETO: 39:11 That was Phillip Coles speaking with us about his career and recently published work. This podcast is brought to you by iILUminate, the Lehigh Business blog. To hear more podcasts featuring Lehigh Business thought leaders or to follow us on social media, please visit business.lehigh.edu/news. This is Stephanie Veto, host of the iILUminate podcast. Thanks for listening.