

## Arthur Audio

### **Interview Participants:**

Melody Hunter-Pillion, *Interviewer*

Arthur Petersen, *Interviewee*

Jamie Currie, *Videographer*

[Due to climate control sensors in the room, occasional audible beeping occurs during the interview session]

**Melody:** For the record, my name is Melody Hunter-Pillion and I am interviewing Arthur Petersen.

**Arthur:** That's it, yes.

**Melody:** Is that right?

**Arthur:** Uh-huh, correct.

**Melody:** Today is Wednesday May 30th, 2018, and we are at the International Institute of Tropical Forestry in San Juan, Puerto Rico. We're discussing experiences with and lessons from past drought and other extreme weather events, including hurricanes. We're also discussing management strategies to improve resiliency in the face of future drought and other weather events.

All right. So, we're going to get started. You know, Arthur, the first thing I wanted to ask is, um, where do you live in, in the Virgin Islands and what area of the particular island? And, and is that the community you were, you grew up in? Or tell us about where you grew up.

**Arthur:** Definitely, no. I am from the historic waterfront town of Frederiksted, which is on the western end of St. Croix, US Virgin Islands. I was born, or should I say I was bred, born, and grew up in the historic town of Frederiksted. I lived there, um, through my childhood years until 1971, when I traveled to the US mainland on a full scholarship to attend Cornell University. I left, and returning after I got my PhD from the University of Minnesota in 1982, and have been permanently living in the islands since then.

**Melody:** Fantastic. And what I'm going to have you do now is also tell me, you know, what your title is or where you work, and also tell us your name. So, tell us who you are and what you do.

**Arthur:** My name is Dr. Arthur C. Petersen. I have had several jobs. So, I was an assistant professor, University of the Virgin Islands until 1994. In 1995, I became the Agriculture Commissioner for the US Virgin Islands, which I served until '99.

In 2001, I went back to teach at my high school, which is probably my greatest joy, to return to the school that I went to and now I'm a teacher. And I'm in charge of a class and I can give to others. That was—I mean, and it felt so satisfying that I was giving back. And I—So many things

that my teachers had done to me or things that they may have done that I didn't like, I made sure, as a teacher, I didn't do that to my students.

Um, I, I share different passions with teaching because I think that students, um—When I went to school, I think, we had a lot a love that was shown to students by the teachers, I think. And, and the kids came to us from homes that they shared love. I'm finding that the new students students – that I'm teaching now – that, that's not something that they get at home. And teachers now become their role model and, and as that, I try to let my students know that they're special to me, they're my babies and I'm there to look out for them. But they gotta act right and they gotta study.

And most of my s-, my students, majority of my students, um, appreciate my style. As when they're, and I encounter them on the street, I don't care who they're with. They stop, they turn around, they come back and I get my big hug. Because I told them that I'm a, I like to get hugs. I don't like to, no shaking hands. I want to feel special, so you gotta give me a hug. So I get it every time, and it's amazing. I mean, the minute they see me, they stop. Because I—I mean, in my years of teaching them, they realize that I care and I think it makes a difference to the teacher if the students get, a, a sense that you care about them. They will excel and they will give you exactly what you want. And that's the kind of teacher that I am.

**Melody:** I think it'd be amazing to be in a classroom with you. I mean, your students are lucky. [laughs]

**Arthur:** Oh no. And one of the things I do, I think why my class is popular, I'm also a very good cook, taught by my grandmother. And I cook them Thanksgiving dinner in the fall, those who are in my class then. And in the spring they get their Easter dinner. And it's a spread for king and queens. There's nothing missing, OK. Uh, and it's—I mean it's not just one dish, it's like, like a banquet. Like if you had a family gathering everything that you could think of that would be there that's local, I have it there. As a matter of fact, one year I couldn't cook for the class and they got very mad and say, "Well, you cook for every class. How come you aren't cooking for me?" And I said to them, I said, "Well, I'm gonna do it." So I, but I—A year later, I did it and I invited all of them over, the ones that missed out. And they got their meal. And of course, you know, after that, nobody's any condition to learn. [laughter]

**Arthur:** You need to roll out the cots. [laughter]

**Melody:** No, that sounds amazing. Let me ask you about some weather though.

**Arthur:** Yeah.

**Melody:** Um, let's talk about, because you said, we talked about Irma and then we talked about Maria. And you said, you described Maria as being--

**Arthur:** Oh, Maria was the worst, w-, was much worse than Irma. Irma had a lot of strong winds, but it didn't cause the kind of damage that Maria did. Um, I think what M-, Irma did was drop a lot of rainfall that softened the, the, the earth that made it easy, uh, when Maria came, the trees just toppled over. And of course, the excessive wind, um, caused a lot of people,

particularly it was more intense on the western-end of the island, caused a lot of people to lose their house roof and, and lose everything in the process.

And I think that most people don't understand that if like for 30 years, you've been amassing your special, your, I mean your, your things that you need to live a quality life, and in a matter of hours it's gone, it's, that's a stressful outcome. And, and you only need to experience it to understand and appreciate the, the horrors that that represent to a family, particularly if their children are involved. But to an older couple, or somebody that's physically challenged, it's, it, the enormity of such an experience, it's unbelievable.

**Melody:** Where were you when Maria hit? Describe to me like where you were, who you were with and, and just, uh, the things that you saw and heard.

**Arthur:** Well, I was at home, at, at my, um, resident in the state of Prosperity which is on the western end of the island. I was there with my two nephews, uh, who, who are in my care and, of course they were there also to help me. And, as the wind started blowing like early in the afternoon, maybe around four, five o'clock. And everybody—I felt fine and yeah, it got a little tense and, no big deal. But probably about after one, two o'clock, that's when the intensity of the wind and, and the rain increased. And for whatever reason, my windows survived all of that until a limb from a, from a tree broke off and pierced my glass windows. And my entire—And all of the windows in the rest of the house just blew open because of the pressure. And from then on, it was a battle trying to keep the water out.

I mean, we lost a lot of stuff as a result of water. And then to top it off, I live at the bottom of a development which is on the flat and the water rolling down the hill from the, the rain just went right through my house, destroying everything that was on the floor. My kitchen cabinets are gone, my stove, my fridge, everything is messed up. I'm gonna need a whole new kitchen, a whole new living room, doors, windows, everyth-, 'cause [indecipherabl] it blew off. So it's going to be a major, um, task, trying to restore my house.

**Melody:** When, when all the windows just kinda blew out, were you, were you, your nephews, the family afraid of any immediate danger to your--?

**Arthur:** Yeah, we were, we were afraid of, uh, like a piece of, um, wood or another limb coming and coming right through and—'Cause someone had lost their life in St. Thomas during Irma, from a piece of wood coming through the window and stabbing them and they end up losing their life. So, that's what we were afraid of. Once the windows were compromised, anything could've come in.

And, and of course, and, and it, you have to understand when, while this was going on, you were trying to identify the most important things in your home, trying to get them in plastic bags or get them up on the bed. Some things you settle. You know, you know, let them go because those are replaceable. But my grandmother's pictures, my family portraits, I mean, those things are irreplaceable, OK? So I quickly grabbed those [indecipherable] and my daughter's graduation pictures and, uh, pictures of my family, my mom, I threw them all in a plastic tub, covered them down and I must say that I saved them. And many of the things we wanted to save, they ended up on my bed. And fortunately, my bed is a huge mahogany bed on poles, or on, uh, on, on high

legs so they were really high off the ground. But guess what I had to worry about? Water coming through the window. [laughs] So that's why they had to go in plastic bags.

So it was not a nice—And as, you know what it sound like? It sounded like four, um, runaway locomotive trains. I mean, that's what the wind sound like and it was intense, you know. And, and the damage really was the combination of the water, and I don't think there was a space there was an, an opening in that house, given the pressure and of the water. That water was enforced in through the windows, through the door, through the key. Um, you know, we put the, the key in the locks, the keyholes.

**Melody:** Keyhole.

**Arthur:** Every place water was coming in. So there was no way to fight it because finally we just decided, my nephews and I that, you know, just chill and let nature takes its course because we, we're fighting a battle that's not going—And then what also was even more, um, aggravating or I should say more devastating thing at my house was that a huge palm tree we had, fell down, uh, right in front, across the driveway, and created a dam. [laughter] So instead of water running off the land, it was dammed up right in front of the house. So it came, forced it through the house, 'cause as it build up, it went over the threshold, right inside the house.

So what we, one of the things we did, we came out—And this we shouldn't, because it was dangerous, 'cause, you know, you had flying galvanized, flying, um, wood everything you think of was, was in orbit that day or that evening. And so we came out, we tied the palm tree to my car. And I was able to pull it a little farther away out to create, to break the dam so the water can run out of the land. If I didn't do that I, the water would probably have raised at least two feet to come inside my house, you know. And I tell you that afternoon before we were looking at the tree. Now at the palm tree and I said, "You know, um" to my nephew, I said, "Well, let's put the car here," and then I looked and said, "You know something? Back it off a little bit." And somebody was looking out for me because the tree fell right exactly in front of my black Nitro. And it didn't hit the Nitro. If that tree had—If I had left the Nitro where I wanted, it would have gone right on and smashed it because it was, the trunk was at least, um, the tree was at least 10 feet, the trunk was at least, um, 2 feet in diameter. It would have smashed into the car. So somebody was looking out from somewhere to say, you know, "Young man, move it back a little bit." [laughter]

**Arthur:** "It will be in your best interest. I won't tell you right now, but you move it back." And it worked out.

**Melody:** Sometimes those intuitions, and you follow them. But one thing you mentioned that, um, you can't fight nature. I mean you can do all that you can do--

**Arthur:** Exactly.

**Melody:** But nature it's gonna take its course. So let me ask you about that. In the aftermath, when you saw what nature really, really did. If you would for me, Arthur, I want you to describe your community, your neighborhood. Like, not only what it looked like and the damage, but what people did, their reactions. And then, maybe a little bit further, to talk about any things you saw with agriculture and things like that.

**Arthur:** Uh, well, let me—My neighborhood, let's go there. Uh. Several of the houses in my neighborhood lost their roof, which is probably the, the worst of the worst that can happen. Bad enough, you got water that blows in under your doorway, through your doors, through your windows. That's, you can manage that. But when your roof come off, I mean, what the wind doesn't blow out, the water then destroys.

So there were, um, two of my neighbors, to be precise, who lost their roof. And then others lost, um, got windows broken, um, and, um, got flooded. I mean, everybody got flooded out. That was just whether you were on the high on the hill or low on the hill or the bottom of the hill the, just intensity of the water and the pressure of the wind, forced water into your house. I think most people were, you know, the morning, everybody was happy that they didn't lose their roof, those who didn't. Um, they were more happy to see that the neighbors were all safe and we kind of gathered around, make sure that everybody in every house was accounted for. That's what, we always do that.

Um, I had an uncle that I had to go in town. He is, uh, he, he was left alone and I had to go in town to look after him. And I had to, to go across a raging river [laughs] or ghut to get in there. Um, had to climb up and over branches that had fell across the street. Um, when I got in town I was even more, I mean, amazed to see trees that I grew up with us as a child, and my parents told me that they were there when they were children, and those things had all gone. They were gone. They just, they were on the ground, across—Many of them blocking the free, the passage of the, um, of vehicles or in the, even the emergency vehicles to get in and out of the town.

**Melody:** And these were the trees from your childhood?

**Arthur:** Oh, yeah, my parents' childhood as well. Um, one, in particular, was at the Episcopal Church on Prince Street. It was a huge tamarind tree and that's, I grew up with it. My mom told us she grew up with it, and that's gone. It's no longer there. And that's one of the things that has happened, uh our tree inventory has been severely impact. So the, the joy of having a tree, and going under the tree and enjoying the breeze and the shade, I mean that's not a reality anymore in many homes or in many yards. That's a thing of the past. So people are [indecipherable] the yard now and restoring their, um, the, the, the landscape. Of course, we can't put back the trees to the size that they were but they kept them as big as they can because, especially if you're in your late '50s, '60s you, [laughs] you, you want to at least enjoy them before you're called to eternity, you know. Yeah [laughs] because it could be tomorrow [laughs] if you think about it.

But, um, the other thing you asked about, agriculture. I, I grew up on a farm, a 100-acre farm, estate La Grange, through my grandfather, the late Isaac Gatewood James and my grandmother, my beloved grandmother, um, Victoria Ann [indecipherable] James. She is a, a bona fide, um, Monserrator. She came to the Island of Montserrat. And she came here in 1915, met my grandfather and started the James family, um, in estate La Grange, uh. We went, I went and checked the farm. Many of our trees or, that we had on that land that's been there for like 30 years, were gone. Um, cattle and animals were loose because the wire fencing had gone down.

Um, we had an issue with uh, stray animals, dogs, and cats, had gotten out. And some of them were just blown into places where they weren't familiar with. And, and in many cases, people couldn't get back to their homes because the roads were blocked. So the animals left looking for food and safety and, you know, we had the, um, the, ASPCA [American Society for the

Prevention of Cruelty to Animals]. They, uh, came down and they set up a temporary, um, should I say animal rescue center. And they worked there for probably for two, three months. And I think got at about 400 or plus animals were taken off the island, which was a good thing.

Um, we visited other farming areas and we, we found out that, um, many of the farm structures were destroyed. Crops [laughs] were, in some cases, the water came through and just wiped out the, the row crops. Um, many of the, the fruit trees were blown. People are still looking for them as of today.

Um, the, in, in following even in, in the cleanup process afterwards, um, as the bulldozers and the, with the, and the heavy equipment was, you know, reclaiming or cleaning up the road side so that they can restore electricity, telephone, or what have you. Many of the livestock fencing became, um, compromised which, you know what that means. Now the animals can now go out on the road. So, it created a traffic issue, um, that, you know, when you are traveling at night particularly, you had to be watching out for stray cattle, stray horses, stray donkeys, um, goats, even pigs. Um, [laughs] so if I, to be [laughs], not to be funny, but there's still people looking for the animals that were lost as a result of the, the hurricane. And of course, some of these animals, particularly in the more remote areas they are now free and they're gonna become wild, just like you guys got wild pig and, um, in South and North Carolina, that is a problem to farmers. I'm sure that at some point, these bands of wild animals that are now um, setting up their own little conclaves out in the wild, eventually will end up being a problem to the farmers. And, um, we have to deal with it, but that's something like, and that will have to be, not probably immediately, but I'm sure that will be something that we address in the not-too-immediate future.

Farmers also, many of them lost their homes. So, they weren't too worried about the farm initially. They were more worried about securing themselves and getting their homes up and running. Um, some of them lost equipment because they got, uh, trees fell on them. Some of them were blown over. Um, some of them were destroyed. Uh, and it was not a very good, uh, farming here is already a challenge, expensive and challenging. And then, to be destroy-, I mean to have two Category 5 hurricane comes within 10, within 10 days of each other, it was a blow not only on the island economy, but also if you look at individual enterprises that makes up our economy, they all took a direct hit, one way or the other.

And it's, it's gonna take a couple of years to, for many of them to, those who choose to get back in business, to get back in. It's not gonna be a, an easy, um, uh, process to just restore itself because we've, it, I mean all the debris has to, like—Let's take a farmstead. All the debris has to be removed. In some cases, your animals may have completely gone or died. You have to restock. You have to put back up your fencing.

I, I mean everything that I'm talk-, I mentioned is money. OK? And so it's a real challenge for our farmers. And the government is trying its best in that. At least, I work for the Department of Agriculture, and we're trying our best to provide as much help to the farmers, uh, as we can in terms of feed and in terms of, um, if a farmer necessarily wants to get fencing and fencing wire, they will buy it and we will pay for the shipment to come in. Um, and we are also working to see if there's, um, opportunities out there to where we can get, um, people that are willing to contribute to helping the farmers in various ways to get them back up and, and running. We did have a small group of farmers came over from Puerto Rico. And they came to, um, if, if,

particular farms, Sejah Farm, and they were able to help them in a week to rebuild lots of the lost structures that they lost. Um, and that was an incredible feat. And certainly one that was appreciated because it shows, um, connectivity and it shows support.

**Melody:** And what farm was that, that they went to, to help?

**Arthur:** Sejah, Sejah Farm.

**Melody:** Sejah. OK, Sejah Farm. So, Arthur, as promised, I'm going to take you back into your childhood. I want to talk some more 'cause I think it's really important, um, people's experiences with their family, um--

**Arthur:** Community.

**Melody:** With their childhood. Yeah, or community, and, and those memories. So, share with us any childhood memories of a particular hurricane that might come to mind. And how your parents or grandparents might have prepared, or different things they might have told you about storms and--

**Arthur:** Well, I have a lot.

**Melody:** OK, good.

**Arthur:** A lot. I, I think the, the one that I remember that, the one storm that I know--Well, let me tell you what we normally do, OK, and then I'll tell you. Whenever there was--I lived with my grandparents in Estate La Grange in a family house that we call affectionately, La Grange. That was the James compound. Um, still in exist-, still there, and the family still has it. It would be a whole day's preparation. We would take all of the contents from the top. The, it was a two-story house. We would take all the contents from the upstairs and bring them downstairs, everything. Pack up all your clothes into trunks and containers and bring them downstairs because the assumption was that the roof may go. And if the roof goes you don't want your beds, you don't want your dressers and your various items that you, that are in your bedroom, to get wet and your clothes to be destroyed. So we'll pack them up and bring them downstairs on the second floor and leave basically, uh the upstairs barren, which would be following the storm, whether there was a storm or not, we'd have to, all the windows would be bolt, would be sealed and, and barricaded.

All the animals would be, you know, the ones that you, like the dogs, you'd probably lock them up in the cellar, which was under the house. And the chickens, you would open up the pens so they can fly and go anywhere for safety. And the cattle, my grandfather would open up all of the pasture gates so the animals are free to move anywhere they want within the confine of the grounds.

And, um, you know, and we'll sit in the house. And the nice thing at, about that time, my grandfather was in charge of all of the operations, so all we had to do was cooperate. And it was kind of exciting 'cause a-, as [laughs] maybe as smart as I was then or I thought I was smart, I really wanted to see a hurricane. To see what it is, because my grandmother told me that in 1928, which was a bad storm that destroyed the island, that they were living in a area on the west end

as well, known as Estate Jolly Hill. And she again had brought her stuff down to the second floor, but she left some stuff upstairs. And she was downstairs on the second floor watching her stuff, 'cause the roof was gone, watching her stuff be blown over into the ghut, which we call our little rivers.

And after that they had to move and relocate for the, I don't rec-, remember exactly what she told me where they went. But many of her stuff for her kids were gone because they took the, the, the items of value. That's what they took downstairs. Some things they didn't, th-, they got lost was no big deal. But I don't think they got [laughs] everything downstairs because she even told me she saw her bed went through the window. OK. I mean through the roof, into the, um, the ghut down the outside into the yard. Um, and I really did not experience—We prepared many times over that, from what I could recall, '70, '60, 1960 to about '71 is when I left the island. And, um, we really didn't have a direct hit. But we did get like the outer bands where it caused a lot of rain, wind, but not an hurricane, like what we've experienced.

My first experience with hurricane, OK, was Hugo. By the way, let me say this. A hurricane did come in nine, I, David and Frederic, they came back to back just like, um, a, just like Maria and Irma. And they did destroy St. Croix in 1978, '79. I think it was '78, either '78 or '79. But I wasn't home at the time. I did not, um, come back until '82. But '89 is when I got—Deep down I didn't want a hurricane to come. But it may sound sick what I'm gonna say, but I wanted [laughs] to experience what a hurricane—So [laughs] I was caught between both of scenarios.

And, but anyway, it was my wife. I was married at the time. Um, it was just she and I. And we weathered the storm for the first time. Now that was a killer, Hugo. And it, for, and understand that at that time people hadn't seen a storm for a period of 30 years, 'cause remember I told you it was '89, no, it was '78. This was '89. And, um, this was a vicious, let me say, terrible storm. Because it's, it was hitting the island from about four o'clock in the afternoon. People were losing their roofs. Trees were falling. And the island was a lot more lush then, so there were more deb-, more vegetation.

Um, the storm actually came in about, around maybe, I'd say about 8:00, 9:00, and it didn't leave 'til the next morning. Still it, and it slow, actually slowed down when it got to the, to the Virgin Islands. And it's, it, it stayed with us for about a period of at least 12 hours before it left. And then the worst part of the storm is when the wind reverse, OK. The direct winds cause the damage, but when it turn, when you get the eye and the winds are in reverse, that's when you get the damage. And that's when people start to lose their roofs. Their cars were blown off porches. Um, windows went. Again, farm losses, flooding, you name it, we had it. OK. That was '89.

**Melody:** And that was Hugo?

**Arthur:** Mm-hmm.

**Melody:** So Hugo, you went through that. Then you saw Maria. When you think about--

**Arthur:** Well, I don't—We went through a couple more.

**Melody:** Oh, OK.

**Arthur:** The ones I remember, George, back, Backward Lenny. That was the one that came from South America in, to us. Normally they come from off the coast of Africa to us, but this one came from South America, so it's, it was known here as Backward Lenny. But they, in no way got, could come close to what Hugo, or Irma and Maria did to the—I remember that Irma destroyed St. Thomas. And initially, St. Croix was their, was a staging stage to help St. Thomas. And a week later, we were right in the same position as St. Thomas wa-, was, to some extent. And in some areas we were worst off than St. Thomas was. Because initially we were sending stuff to help our brother and sisters in St. Thomas when hurri-, when, um Maria hit us within 10 days later. [laughs] We, we in a position where we were like St. Thomas, now we needed help.

Um, but I think that the, the probably the biggest complaint I'm hearing from people which, I understand, is the loss of their homes, and no roof. That's where their, that's the concern, you know. They, 'cause some people put all of their life savings in their home. That's, that's where, that's like the, that was their bank account, their house, and they've lost it. And then, in some case, the insurance was pretty costly and they didn't have insurance. And they now had to find means and going to their personal bank account that they had for their rainy days, their retirement and what have you, to now go, go to that, or go to other means of getting a loan to bring the house back, because you're not going to walk away from your house. You need a place to live. So that's the big challenge of that, like right now, restoring your home, getting back to some degree of normalcy.

And I think one of the things that my grandmother, you asked me some things my grandmother told me, and we experienced it. My grandmother told me -- listen carefully -- that any time that you have a bumper crop of mangoes or avocados, where they bear in abundance, I mean just, I mean, you can't turn that people are offering you mangoes, willing to give it to you, or avocado, that that's not a very good sign. That's an indicator that you're gonna have a terrible storm gonna come. And in the case of Maria and Irma, we had a bumper crop of mangoes.

I'm telling you, we have an orchard at the Department of Agriculture where I'm employed correctly as a deputy commissioner. I manage the orchard. There days you come in and a whole limb filled with mangoes would just break and fall because there was, there was so much mangoes on the tree that the limb couldn't carry the weight. Avocado limbs were breaking as well. And of course, everyone came in and said, "Boy, that's not a good sign," you know. Because my grandmother told me or my – it was an elder – told me that when they see all this crop, of this, all this, uh, not crop, but crop of mangoes and avocados, an abundance. That means that a terrible hurricane is coming or we—They don't say hurricane, they say we're expecting bad weather. Bad weather will be coming. And surely we got it, OK. It came in and if, if you wasn't a believer then, I am now a converter. I've been converted, OK? All right.

I believe it now what is wives tale or pure superstition, common superstition. I believe it because I've seen it in other, in other times. And of course, remember my grandmother, she was born in 1899. So, by the time she told me and died in 1974, she had 74 years and seen a lot more than I've seen. So, I value that experience. And then I think, "I'm sure she heard that from her mother," who was born in 1830. OK. So, in, in 1867, sorry. OK. Um, so it's not like just [indecipherable] it's been, we call oral tradition taken down in terms of what somebody experienced.

And the other thing we, that, you, to know that a storm is coming. Before, you always hear birds singing and chirping in the trees. When they disappear, and there's silence on the land, you don't hear any birds. You don't see a bird flying. You don't see any creatures moving because they're all moving inland or to a more secure place. That's another sign that a bad storm is coming. "And then you also watch the sea," she said. "And the sea is usually very calm. Calmer than usual." And she calls it, "The calm before the storm." And I saw that those before, um, Maria came in, OK, and—Irma and Maria came in. So, there is probably some truth to it and, and it's probably experience. They associate certain things with, um, with the occurrence of storm. We call it superstition. They call it experience. [laughs]

**Melody:** So it's experience, and even though we call it wise tales, superstition, it is experience. So, they've seen it before. They make a note of it. They talk about it. Um--

**Arthur:** And, and they document it.

**Melody:** It's—Yeah, document it, but sometimes there might be some sort of science or reason behind it--

**Arthur:** Exactly.

**Melody:** They might not know the science behind it.

**Arthur:** Exactly.

**Melody:** There might be something.

**Arthur:** Exactly.

**Melody:** So, this is interesting. So, let's, um—I love that you'd told me these different ways and some of these longer-term ways of seeing when something is about to come because of the, the crops. And some are more short-term and the birds move away and you don't know. Um--

**Arthur:** And the ocean silence.

**Melody:** And the ocean. Um, so we talked about hurricanes, but let's turn to another extreme weather condition and let's talk a little bit about drought. So, I know Puerto Rico really had a tough time with it, but the Virgin Islands also--

**Arthur:** Also.

**Melody:** Did they experience drought?

**Arthur:** Let me make it very clear that, that the agriculture of Virgin Islands is a rainfed agricultural system. We really do not—Irrigation is not something that we're big on, although we do. There are farmers who use it, but the majority of crop farmers depend on the rain. They time the planting with the rainfall. So, any deficit in rainfall is a direct hit on agricultural activities. Not only on crop farming but also on livestock, because certain of the livestock are foragers. They need vegetation and when there's, when rainfall becomes an issue, the pasture vegetation

dries up. The quality of the proteins in the grass diminishes, diminishes so the animals are just eating and they're not getting the level of nutrition that they need, so it creates a problem.

The, the drought that we had in 2015, I can say this to you. I grew up, born, raised, grew up on the island of St. Croix. I've experienced the droughts in the '60s, the '70s, and the '90s, because I was back by then. I have never seen grown, mature trees, coconut for example, where the entire tree would die. And I'm not talking about a tree that's a year or two. I'm talking about trees that were fruiting, with fruits, just dried up and died. That was how intense the, the, the drought was. And it was not just in, in Frederiksted area or the west end. It was throughout the entire island. Um, you saw animals dropping because basically there was no food for them.

And especially the big problem we have with farmers, livestock farmers, is trying to have them understand that you need to pack – or I should say stock – your pastures to the carrying capacity for the worst times. So instead of having maybe 2 or 3 animals let's say in the case of, of goats and sheep, 2 or 3 animals per acre, they may have had 10. You know the outcome. In terms of cattle, it is one cattle for three to five acres, OK. So, if you had five acres you should only have how many cattle? One. But some of them may have had five. So now that's—And not little calves or little, um, 200 lbs young heifers, but bulls, mature animals. That's, those are mowing machines. They're going to eat because that's what they are designed to do, to forage. And it's a matter of time they will denude an, a pasture, the way you, you just see the earth and rocks. And that you saw it in the picture this morning in the presentation.

**Melody:** Overgrazing.

**Arthur:** Overgrazing. And that's a major problem. And again, as I said, we do not, in some areas of the country, they irrigate the pastures. We do not do that. We depend on the rains to do it. So, as the big discussion is, at, around the department, is trying to, like, now our veterinarian has put out circulars and public announcement telling the farmers there seems to be drought-y condition coming at this year, 2018. Start—First of all, separate your, your males from the flocks so there'll be no more, um, breeding of, of young ones. Two, start reducing your herd, selling them off to get the animal, or the, the carrying capacity down to where it needs to be. 'Cause if we're locked into a drought, it's going to be for the next six, seven months, OK.

At least, we're hoping, and we're predicting by, um, August, it should start to rain. If it doesn't, we're in trouble, OK. Even at the department level, I am bringing in reserve food, stocking a warehouse, as a supplement to meet the shortage that's it's going, that's already developing. Um, but we, there, we, you know, to at least have some food to keep the animals alive. So, that until such times that the condition changes.

**Melody:** So, you're anticipating definitely drought in 2018. You're trying to prepare by getting this--

**Arthur:** No. We're not anti- we're, we're feeling it.

**Melody:** You're feeling it already.

**Arthur:** If you listen to Dr. Stuart's presentation this morning, he strong-, he did indicated that we live with it every, every day, every month because our system is a rainfed agriculture system.

So, any reduction in moisture, whether it's this month, next month, has a direct impact on the farming activities the Virgin Islands.

**Melody:** But it sounds like you have a big communications push out there what you need farmers to do.

**Arthur:** Exactly.

**Melody:** Do you feel like they're listening and responding? That's the big thing.

**Arthur:** Well, I would say they're listening. Question is are they responding? Are they're doing what they were advised to do? And that's a problem here and everywhere else, you know, that they may think that we're forcing them to sell their animals and there's no really reason why, um, until when the real, the reality kicks in. And they are convinced that they, then they're going to come running and saying, "Well, we-" But then who's going to buy animal that's are ready to die or that has no—Is mostly bone and no flesh to it, you know?

So, now is the time, while they have weight, to get rid of them. You know, put them on the mar-, even if you experience a little loss, it's better to get something now than two months down the road you have just this skeleton of an animal and trying to pass it on. Nobody's going to buy it, OK. And there's not going to be any food out there. Or, what many of farmers do, they go to, you know, public areas and they will cut feed, harvest the, the, the grass and the—We call it, we say “bush”, but it's actually legume, legumous trees, branches, and what have you that has proteins that they can augment their pastures with. And they will bring it, cut it, and bring it, and carry it to the farmers. Then [indecipherable] to the farm where they'll provide supplemental feed to the livestock.

And many of them are doing this already because they seen, the, the conditions worsening. And we're, we're, and we are advising them that it's, it's coming because I think, to just take one of the discussions we had this morning, um, in my group, was that we need to have some indicators that farmers are familiar with so that when they s-, they're experiencing that on their farm, they should trigger immediately that there, these are not normal times. That these are times that we need to start throwing in our conservation effort to reduce our, um, herd population, um, you know, remove the males from the flock, and do all the things that necessary to as part of them, them—And they should have a mitigation plan to begin with, that when they see the signs that should trigger immediately, "Look, this is what we need to start doing to kinda start mitigating against the impending problem that's coming." 'Cause feed will be an issue.

**Melody:** Let me ask you then, and you're saying in addition to the mitigation plan that the farmers need some sort of, um, indicators or triggers.

**Arthur:** Yup.

**Melody:** So seeing these triggers. Um, do you guys, have you guys developed those sort of indicators and given it to--?

**Arthur:** Yeah, we do, we...

**Melody:** OK, so they have those.

**Arthur:** 'Cause we, we, we know that eventually as, as a senior manager of the Department of Agriculture, and the, and the commissioner that, myself, the assistant, OK, we know, right, that we are going to be the heads leading the response to the farmers if they end up in a real drought situation. So it's, it's upon us to start giving them feedback as to what's happening so they can start getting themselves prepared before a crisis come up. Because if we don't, we gonna end up with it, it's gonna be our baby anyway. So if we better inform them and they can help themselves, it's gonna be less of an impact on us in terms of trying to address their problem.

**Melody:** Let me ask you to list just some key triggers. What are some of these things that are definite indicators? If a farmer sees this, they know they need to start taking action. What are those triggers?

**Arthur:** Um, one of the things would be, is that the lowering [indecipherable], maybe over uh, for a, a month or two period. Your grass starting to dry up, OK. You, especially, most, a lot of the soils here are clay. And what happens as the soil is drying out, they, they start, the soil starts to crack and they open up. And, yeah, OK. And when you see that happen, that tells you the earth is cracking. That, that's your sign that that's a drought-y, drought, is a drought condition there developing. So that should be your trigger that you need to start thinking about what you're gonna do, if a real drought come, with your animals. 'Cause there is no—You can buy supplemental feed, but that's not, you're not gonna recover the profit. 'Cause it's expensive, it has to be brought in. And even if I bring, department bring it in, it can be subsidized, it's still investment in the, into an animal that you may not necessarily see the benefit of. Because you may put more in, because you kept the animal longer so you feed it longer, so it's, you're dipping into your profit line. And that's a reality that they have to understand, that it's not—The quicker you get the animal up and ready for market, the less you have involved. The less investment you have in there, you can see a profit. If you keep the animal two years to see a profit, your profit is gone. What you gonna do is just recovering something.

And if you put that against what it cost you... I encourage my farmers as well, to keep records of what you do in your operation so that you know what the cost is. Whether you do it per animal, or you do it per pound, or however you choose to do it. You know that you have so much investment per pound that's of, of, of, um, lamb, or per pound of beef, per pound of mutton, from goat. So that you know where your breaking point is. If it gets to a point where you see, "Hey, there's no—" [laughs] It's, the best solution is to get rid of them because keeping them any longer is not gonna be profitable. You have already met your threshold. It's time to, to unload. And I think it's, it's something that they gonna have to be convinced of before they be willing to pass it. But the ones who are business-oriented, they connect. And they, they do what they have to do, OK.

**Melody:** What's another trigger? So we've got the, um—You see that soil cracking.

**Arthur:** Yeah. You see the, the grass drying up.

**Melody:** Mm-hmm.

**Arthur:** You see, you notice that you haven't seen rain for at least, say, two months, OK. Those are all indicators. Um, you may drive around the island and you see that the, you're not just seeing your pasture, but you see other pastures as well, experiencing the same condition that

you're experiencing. That should tell you something, OK. [laughs] And it could also tell you that there's a problem. You see somebody who has been doing good conservation practice and their pasture look very good, and yours look like hell, should tell you that something is wrong, OK. And that, that, you see that, you just, you just see it all year, [laughs] OK.

But if you see the distinct difference now of somebody who's been practicing the right methods compared to you who is not following the right method or the recommendation of the Department of Agriculture, including the university Extension Services is putting out, that should tell you that something is wrong. You need to check yourself.

**Melody:** When people see that difference, because one of your colleagues was showing that today.

**Arthur:** Mm-hmm.

**Melody:** I mean, that visible demonstration of that really makes a difference. Has that been a motivator for some farmers?

**Arthur:** Oh, yeah.

**Melody:** When they can visually see that difference?

**Arthur:** They usually come and ask you, "You know anybody wants to buy the animals?" OK. And if you got 10, 20 animals anybody can buy 10 animals one time. They may take three, four. And it's not just you having animals. It's the, the other irresponsible farmers, all they too that have done the same thing, so you're probably talking about at least two, three hundred animals to get rid of in a short period of time. Which could be in some cases, very challenging for, um, to market because they may be, they'll probably sell but not within that short window, OK. Because you know fa-, the, the meat stall will buy them, their capacity to store all of them may not be there. So it's, they'll have to stay on the hoof before they're slaughtered. And of course, the challenge that represent, they're losing weight, they may even become sick and diseased, they may die, so...

**Melody:** So, that's livestock farmers but what about farmers with crops? What in the world do they do with, you know, what?

**Arthur:** Most of them, when they see the rain not coming, they just don't plant anymore. They just, they just stop because they know they're gonna lose their, their bottom, their bottom margin. So they just, they choose not to, to crop anyth-, or they may put in selected crop like watermelon that could kind of take the heat. Um, and kinda you may not get the, the size of fruits that you normally get with a lot of rain, but you will get something. Um, they'll, they may use that option. But the majority of them, based on my experience, even my grandfather way back, he would choose not to plant during that period of time. He let the ground fallow. He may put in a cover crop. Let the cover crop, uh, you know, keep the res-, you know, cover the land. It helps to conserve moisture. It also, because of the green mass, it will add organic matter to the soil when you, when you incorporate it into the soil. So, that's an option that you can exercise always. Is to just let the land go fallow.

**Melody:** I think you've already talked about some of these coping mechanisms that help when there's drought. To what extent do you consider drought when planning for the future? And you've already talked about that some, but, um, if you wanna go into--

**Arthur:** I, I would think, I would think we—First of all, none of us here have—I would love it, because I like to know where I'm gonna be at—That magic ball? That you kind of say, "Well, magic, magic," or the mirror from, um, that fable, um, Snow White. Snow White, yeah. "Mirror, Mirror on the wall, tell me where, when the next drought is gonna be." We don't have that. So all we can do is really depend on the climatological data, look at past trends, keep up to date in terms of weather patterns, talk to your local meteorologist, consult with people at the university, at the Department of Agriculture to find out. You know, if you see things that are happening, share information, talk to your fellow farmers, see if they're experiencing—'Cause maybe you be doing something that you will be, and not aware of that, that you're contributing to the problem. OK? So if you talk to your fellow farmers, they may help you to see something or they'll give you signs that are obviously there that you're not seeing.

Uh, but I think one of the things that, that I need, we need to encourage farmers to do is, is to have communication among themselves. Share information, reach out to people who are the technocrats, to get information to help them make decisions in terms of what would be the best crop, timing, variety selection, um, how to lay the land out in terms of conservation. You don't want to lay the land out to where you—Because if we lay it out and you, and you irrigate, you're causing soil erosion, or if you, you bank the land in the wrong way. When I say bank we, we plant on banks. We harrow, then we bank the land. The case of drought, or not drought, the case of lots of rainfall, the roots are up, up and not at level. Certain crops we do that especially the yams, our local yam, not your yams, we call sweet potatoes. [laughs] OK?

**Melody:** The real yams.

**Arthur:** The real yams.

**Melody:** OK. [laughs]

**Arthur:** Our local sweet potatoes, cassava, they plant them in embankments, OK. And there's a reason the drought, not, not the drought, the water they get to drink. Um, but they're heavily mulched if they're properly done, OK, for conservation. Um, and if, and if, and if they follow all these opportunities that they are taking to, to engage people and to seek out information, they'll be able to make good choices, you know. And, um, if you're in doubt, ask a question. That's the best, that's my, that's my attitude, you know. Uh, and also, um, be very observant. Know your, know your plans. Know your craft. Know what you're trying to achieve and stick with it, you know. And you should have minimal problem.

Of course, like I would say farming is a losing business. And why? You take your money, you buy the crop, you put in the field. Guess what? You or I have no opportunity to intervene and says, "Bugs don't show up here today, go elsewhere." You can put them out this morning and by tonight you can have a bug infestation wipe you out of business. Your money is gone. You have to start all over again. All that investment is down the drain. So, it's a very risky business, but it's a business that I love. I love the risk, and I enjoy doing it. And when you have a good crop, and you see the smile and the grins on people's face, it's even more—It's self satisfying, and it's also

motivation to carry on because you see the value of what you're trying to do. And I think farmers are valuable people, just like teachers because teachers provide knowledge, farmers provide sustenance. Which feeds knowledge because if you're not in a good nutritional status, you don't think very well.

**Melody:** I like how you put farming and teaching together. You do both. This is perfect. [laughter]

Let me ask you this, because you're right, um, farmers are valuable people, and, but farming is risky. But what you're saying is that you can mitigate some of the risk. You can't control everything, but you can mitigate it by trying these methods that you've talked about.

**Arthur:** Yeah.

**Melody:** And as you talk about these methods and the importance of sharing and communicating, is there, are there any new mechanisms that you guys are using now to try to get farmers to do that more, or is it just really sort of the same thing and, and doing more of it?

**Arthur:** Yeah, we're trying to get the farmers to use, um, plastic black cloth. Um, as a farmer reducing water even—'Cause when we, one of the problems is the high evaporation rate. So if we grow the crops under plastic, only place that we're losing water is where the crop, plant is, the rest of this, the moisture. We also encourage farmers to use, um, drip irrigation system. Again, that, you put the water exactly where it is needed. One would not be recommending the Virgin Islands to use furrow irrigation, where you just flood the field, and let the water run down. You know, what you're contributing to is a waste of water. And the water, most, most of it is going to be evaporated away and not being used by the crop. So that's a no-no.

**Melody:** And what is the name of that system again?

**Arthur:** Uh, it's called open f-, it's furrow, furrow irrigation. Where you just, remember I told you we, we plant in banks and hills, OK. The hills would be the banks and the furrow would be—And where you would, we would irrigate down the furrow, which would be the valley. And you don't, that's not rec-, recommend. In some way, you [indecipherable]. I think, I was just gonna say local, I think. Where you, where you have water knocking [indecipherable] that mean you have water in abundance. OK, knocking [indecipherable] for anything means you have an abundance.

So I should have told you that too when I said that the mangoes were knocking [indecipherable]. That means there was an abundance of mangoes and avocados. So anytime you hear somebody said, "Man, fish knocking [indecipherable]," that means there is a lot of fish running all over the island. So there is no shortage whatsoever.

**Melody:** I'm glad you're using some local expressions, but you're telling us what they mean. I think that—So what, um, when you think—We've talked about some different extreme weather, um, hurricanes, drought, but when you think about these extreme weather events, which ones are you most--

**Arthur:** One of the things we could put in there, and we can talk about you know, with the hurricanes, right?

**Melody:** Yeah.

**Arthur:** They could, if they, if they, if the insects carry on in the right level of the stratosphere, you can blow—Cause it's happen. We brought locusts from Africa in one of our storms many years ago. They just happen to be positioned at the right place and we had them come into the Virgin—Of course, it didn't last long, but it showed up on the Virgin Islands. The, the locust that is predatory in Africa came on the hurricane winds. So that's another effect of hurricanes, that they can bring in, introduce pestilence from other regions from where they travel. So that represents a danger as well to our agriculture industry.

**Melody:** Of the different events that we've talked about though, and there, and the ones we didn't. We got drought, hurricanes, floods, wildfires, which is--

**Jamie:** Look ahead .

**Melody:** Yes. As we look ahead, what extreme weather events are you most concerned about as you look ahead and look into the future?

**Arthur:** I think we will stay fo-, we'll be, always be—Because the reality of agricultural on Virgin Islands, drought is a reality. Or drought condition, a water deficit, is a reality. And the Department of Agriculture, and the research effort of the Department of Agriculture, that's one of the, the areas of research that, that they concentrate on, whether in terms of crop selection, in terms of varietal recommendation, in terms of cropping methods. That's something that will always be something we, that we'll be challenged by. The reality is you have restricted or you have deficit water condition. How can we develop farming system that mitigate against that? That's our challenge forever.

The other thing that, that I would say, that's my personal opinion, that would be a major concern, would be windstorms because of the devastating effect it has on the farming community, particularly the crops and the farmstead in terms of its, um, structures, and its machinery, its equipment, and supplies. They can all be disappeared in a matter of minutes.

**Melody:** And then, even as you talk about those things, the very specific things. Drought, windstorm...you have to be concerned with those, you always have been. But, have you noticed changes in the frequency, severity, or duration in those particular weather events?

**Arthur:** I think, I wouldn't say, I've seen, I think they're more erratic. You know, maybe before there was a pattern that you could count on, but they can just show up. And they may not last for the time that you thought that they would last, but they'll be not, they'll do enough damage that can put you out of business in, when they do come. Um, like we would say a hurricane would show up maybe every 30 years, that's not true, OK. That's what we would anticipate. But that's not true. We think a drought will come, um, maybe every, maybe every 5, 10 years. We're not seeing that. We see it does come but it may not be widespread to have a meteorological drought which could be widespread compared to an agricultural droughts which may be specific to a region or to an area, if I'm using the terms correctly, um, where certain crops are affected

whereas others aren't. Because of the fact that they're not having a meteorological drought, there may be lots of monitored rainfall in the other area.

And I think it's all about monitoring and knowledge. I think, I am committed as a teacher, as a manager that information or access to information is an incredible resource to change your mindsets. And I think that's where we are. Our—And even if you look at the, the paper, um, one with the first group break-out we did today was looking at a manuscript that they're preparing to become a public announcement, um, mechanism to reach out to farmers. It's all about information sharing so the farmers can use that, you know, and uses what is worth to them to make choices that are in their best interest. There is no one solution I can paint across each farming operation.

You have to look at it. We have to tweak it, modify, twist it, or tear it up, you know, and come up with your own. But at least you can use that as a sounding board to develop your plan that you know that's in your best interest. Or, if you don't have one, you can take the better, the best parts of those to help you to get something in place so that you can alleviate some of the problems that you may be having, whether it's an era of drought, windstorm damage, insect predation, crop choice, crop selection, um, planting methods, cultural practice.

You can use them for all of that. And, and I don't think that it's, it's meant, now that you get it like a recipe, now you only bake it this way. Even the recipe we tweak, because maybe we don't like this particular ingredient so we substitute something else. And farmers are allowed to do that even with these guidance that they get on these handouts.

**Melody:** That's a great analogy. I like the recipe analogy. You are an excellent interviewee.

**Arthur:** Thank you.

**Melody:** I don't even have to ask you any questions and you just got it. Is there anything else you want to add that you, like, "I really need to say this is important" and my questions didn't address it? I, I mean, or something?

**Jamie:** Or something, if there's something that you'd really—If there's like a takeaway message or some, something that you really wish people would understand or know.

**Arthur:** I think I said it earlier, but I can repeat it. I think that one of the things that the, the general community, whether it's on the mainland, over here, needs to understand that farmers are an important part of our community. And they need all the support, um, financial and encouragement, that they can get in order to provide their community with nutrients or with healthy choices. Whether it's in the area of livestock, or crops, or fruits. That's what we need.

Because I don't think, in other parts of the world as a teacher, teachers are revered. They're important people. Just being a teacher. In other places, farmers are looked at with, with pride and satisfaction because people realize that they produce food and that's why we're alive and doing well. But here, we take that for granted, and I think that mindset needs to change. We need to value farmers for what they are. They are our line for self-sustainability. They are the source. Because [laughs] most of us ain't going out to farm. We depend on those farmers. Whether they're in the borders of the US or they're somewhere else in the world, their charge is to provide

food to maintain a healthy population. And they need to be respected and appreciated for that. That's what I would like to leave.

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