

## Food Fight - S1E7 - Is technology protecting or exploiting our seas and oceans.mp3

**Matt Eastland** [00:00:06] Welcome to the Food Fight podcast from EIT Food. This week, we have a special live podcast recorded at London Food Tech Week presented by YFood.

**Lukxmi Balathanan** [00:00:15] There we were invited to host a session discussing the innovations taking a place across the blue economy, where we brought together experts to talk about whether technology is protecting or exploiting our seas and oceans.

**Matt Eastland** [00:00:28] So without further ado, let's head over to the stage.

**Matt Eastland** [00:00:38] OK, guys, welcome to The Food Fights. I am Matt Eastland.

**Lukxmi Balathanan** [00:00:42] And I am Lukxmi Balathanan.

**Matt Eastland** [00:00:45] And as you've heard before, so we work for EIT Food, which is an organisation who are building an innovation community to improve food together.

**Lukxmi Balathanan** [00:00:52] So throughout the podcast series, we'll be looking at the key challenges facing the food sector. And the theme that we'll be discussing today is technology protecting or exploiting our seas and oceans.

**Matt Eastland** [00:01:03] Yes, so I mean, as the guys were saying earlier, so our seas and oceans are incredibly important. Not only are they home to like hugely diverse wildlife, but they also feed billions of people around the world. They provide income to millions of people as well. Our oceans and seas provide fifty percent of the oxygen that we breathe, and they absorb fifty percent of the man-made carbon dioxide as well. So extremely important.

**Lukxmi Balathanan** [00:01:26] But unfortunately, after years of overuse and pollutions, our oceans and seas are facing a pretty great challenge at the moment. And total amount of marine, very, very sea life, including fish, have declined by a third since 1970s. And a lot of this has been attributed to the fishing industry. And it's also because of the worldwide consumption of fish has doubled since the 1960s. And the global fish stocks is about at or below sustainable levels right now.

**Matt Eastland** [00:01:54] Yeah and so and as we've been hearing as well, so millions of fish are also wasted every year. So they're caught unnecessarily and thrown back or that accidentally killed in fishing nets and hooks. And to make matters worse. Only about twenty percent, again as we've been hearing, of the fish that's actually produced for human consumption actually makes it into our stomachs eventually.

**Lukxmi Balathanan** [00:02:14] You know, an issue that we've been hearing a lot now has been the plastic that ends up in our ocean. So eighty million tons of it a year. And I know a lot of you have heard about the great Pacific Garbage Patch. So scientists have looked at tried to analyse what type of plastic is in there. And forty six percent of that is composed of fishing nets and the fishing nets lost at sea continue to catch and trap marine life. And this has been called Argos fishing. So not only is that plastic harming the marine life, but then it ends up harming us because it just comes back and makes it back onto our plate.

**Matt Eastland** [00:02:46] So now is a good time to introduce our panel. So as we say that we're discussing, the topic is technology protecting or exploiting our oceans? Our first panellist is Thor Sigfusson, the founder and chairman of the Ice and Ocean Cluster. Thor is an Icelandic entrepreneur, speaker and writer. He's written five books so far, think another one coming. And he dwights about topics on international business, knowledge networks and salmon. Hello again Thor. So our second panellist is Dr. Hordur G Kristinsson who is the Chief Science and innovation officer of Matus. Hordur's also an adjunct associate professor at University of Florida. He's a courtesy professor at the University of Iceland. He's published, I think one hundred and ten papers, chapters and books. And he's either been directly involved in or founded several start up. So hello again, Hordur. And finally, we're joined by Isabel Hoffman, who is the CEO and founder of Tellspec. So Tellspec's the company behind the world's first food sensor and is working with EIT Food to tackle fish fraud. So welcome, Isabel and welcome everybody to The Food Fight.

**Lukxmi Balathasan** [00:03:53] Isabel, I'd like to start with a kick off of you today. So could you tell us a little bit about yourself and also the work you're doing with Tellspec?

**Isabel Hoffman** [00:04:00] Hi. I'm actually a mathematician and Tellspec is my eighth company, so I'm sort of a serial entrepreneur. And Tellspec was actually born out of a need to understand what is in the food. My daughter was sick and we couldn't, we could pin down that the food was what was making her sick, but we could not really tell what was in the food that was making her sick. So I start exploring the idea of how do we build small sensors that can actually read the molecular composition of food. And that's what our stock does today. So we have a small sensor. It's a spectrometer, in fact, effectively, but it's small. The computational power is in the cloud. And we use machine learning to look at the calibrations, to actually look at the fingerprints that we're reading. So it's a complex project, but it's bringing digitalisation of the food into the industry. There's much more, of course, we can detect from the molecular composition. Some aspects of fish fraud as well. And we can detect the quality, the freshness of the fish, the nutritional value and some of the ingredients. We may not go very, very small trace close to trace ingredients because of the technology, but adulteration is very easy, for instance. We recently did some classification models and we have over ten thousand scans of whitefish right now, probably the largest near-infrared database of fish in the world. And we decided to divide the data and cheque if we could analyse whether or not the fish was Tilapia. Well, we got percentage of our resolution in terms of visibility of seventy two percent. Now, that's no longer random. That's already, you know, substantial. I think we can improve that drastically. And as you know, Pungo is actually one of the biggest issues in fish fraud. It's grown in Vietnam, most of the times in Vietnam. It's then made into fillet and sold as Sole or Grouper. Benghazi's typically sells for four dollars a kilo or four euros a kilo, actually, and are solo Grouper, we're talking about fifteen to sixteen to seventeen euros a kilo. So that is not just, you know, lying to the consumer by paying more. There's other aspects, for instance, is Kalia replacing tuna? Kalia is actually a fish that is detrimental to our health. It's been forbidden in the European Union and in Japan because it causes gastro intestinal problems in human beings. And there was a study done by Oceana, an American company that protects the oceans with one hundred and forty six restaurants in New York. Are they offering Tuna? And not one of them was. So it's it's very serious. There's this problem. The food substitution. And we can detect that with more and more data. We can really help.

**Matt Eastland** [00:07:00] Excellent. Okay. Thanks as Isabel. So if you're talking about technology, about transparency and trust, I guess I've got a question for everyone. Do we

really need technology to support our sustainable blue economy or actually is the question that we should just be fishing less? So Hordur, what's your take on?

**Hordur Kristinsson** [00:07:18] We need both. You know, they can't, you can't do it, do either one. You need to need both. You need full traceability. You need to understand how well you're managing your resource. And then what you pull out of the ocean, you need to utilise it one hundred percent. That's really our goal, one hundred percent. Nothing gets wasted.

**Matt Eastland** [00:07:35] And Thor I'm assuming you agree?

**Thor Sigfusson** [00:07:36] Perfect Answer.

**Matt Eastland** [00:07:38] Ok.

**Lukxmi Balathasan** [00:07:39] And so I guess it would be really good, I know you are for Matus and in other work, you're taking sustainability - you feel like sustainably can be achieved. Can you give us some examples of some of the projects you're working on with EIT that are really focussing on innovation, supporting a sustainable blue economy?

**Hordur Kristinsson** [00:07:55] Well, with the EIT Food, for example, we are the communication project. We don't persay have a product development project on seafood, but we have fish feed projects, for example. One project we have is we're trying to find alternative ways to feed aquaculture and fish. Currently or in the past, we used to go to the wild. We used to harvest fish to feed fish. Now we're seeing more plant proteins being used. So we're using less wild fish to feed the agriculture fish. But with EIT Food, we actually are looking at different sources of protein. And one of the projects we're looking at insect and fish grows perfectly on insects. I mean, it naturally eats insects. So why not field insects? And in another project, we're actually using seaweed. So the seaweed not only can the fish eat seaweed, but the seaweed can have a positive effect on the microbiome of the fish itself. So the fish becomes healthier and the other grows faster gives you a better quality product. So thats two examples of EIT Food project we were trying to do better using less of the wild resource to feed aquaculture fish and grow more fish for the growing population.

**Matt Eastland** [00:08:57] Thanks. And picking up on that Hordur and going to Thor. So is this just about fishing sustainably or is it also about how we behave with the fish that we've actually then caught?

**Thor Sigfusson** [00:09:09] I think it's, of course, both and in many ways, what has worried me a little bit is that I feel that often the media is depicting fishermen as pirates. It's so easy for us to talk about the over exploiting of, you know, fish stocks not doing anything other than just thinking we need to put sort of some kind of policing over the whole industry in all countries. What about, I think we should try to do is to empower them, to get them more tools, to do more with what they have. Educate them and bring their children into the business sort of again, somehow. And I think that's a great challenge for us. But it's something that is very worth, worthy of the effort. Definitely.

**Matt Eastland** [00:09:57] Isabel, I see you're nodding your head. Have you got a perspective?

**Isabel Hoffman** [00:10:00] Well, I was thinking actually that of course to complement what you're saying. One of the biggest problems we have actually in the fishing industry is actually the unregulated and reported illegal fishing, which happens everywhere in the world. I don't know if you saw the recent news. There was a big fish, a big boat that was caught by the Malaysian government. And these boats had been in a radar of, you know, quite a few of the regulators that it was doing illegal fishing. They had inside a twenty-eight kilometre fishing net. And inside the boat there was about twelve to fourteen Malaysian slaves ok. They estimated that the boat alone inside at over five hundred million dollars/euros of annually of fish. Now, this isn't regulated and reported and brought into the food chain as if it is part of it. And what's happening here is the unfair competition that these boats are giving to the fishermen, the ones that are following the regulations, the ones that are saying, I'm not fishing here. I'm giving an opportunity for these areas, for the fish to grow again, for the resources to grow again. But meanwhile, there's greed in the world and there's people like this that are doing this. And technology here can really help how? Well, sensor technology satellites. Let's put these boats in satellite. Let's see where they're going. Let's scan the fish that that exists. Let's see where they came from. Let's block chain this stuff. Let's really track this from beginning to end and not accept this fish into it. How does this fish get into our chain as legit fish?

**Matt Eastland** [00:11:46] So that's a really interesting point. How do we know then that the fish that we are buying is actually then caught sustainably? You know, so from a consumer perspective, how are we to know that these things are happening and the food, the fish that we're eating is actually is a sustainable piece of fish.

**Isabel Hoffman** [00:12:01] Like right now you don't. But we are living through a technology enable shift, which in ten years you will. Ten to fifteen years it will.

**Matt Eastland** [00:12:10] Whose responsibility is it to regulate that? So, I mean, you're talking about like this sort of data driven future. But, you know, who's going to be sort of regulating it, protecting us from that? I mean, Thor or Hordur?

**Thor Sigfusson** [00:12:22] I think..well, we in Iceland, Norway as well. Many other countries have up to 90 percent of their catch being sustainably caught with the Marine Stewardship Council verifying all our caps. So we have these international bodies that are actually doing that job. And I think. But we're talking about completely different worlds. We think that the system that we've pushed is quite good for the areas that we're talking about. But there is a challenge in other areas, of course.

**Matt Eastland** [00:12:54] What do you think Hordur?

**Hordur Kristinsson** [00:12:55] Yeah. I mean, to add we actually in Iceland, you can trace the fish to the actual harvesting ground. So we do have a full traceability system. And, you know, we would love to move that model to other regions. Obviously, it's a very attractive business. Over five hundred million dollar or five hundred million euro annual operation, you know, off the books. So it was not easy to change the system, unfortunately.

**Thor Sigfusson** [00:13:19] But I'd much that though, because you were mentioning I have never taken that into account fully. But I was telling you that fifty percent of the catch is actually thrown into the ocean again by the fishermen and that there's nothing wrong with it. We think it's legal because it's the head the intestines and the bones and what have you. The consumer takes that thirty five percent off. You know, you were down to fifty percent of that fish that's actually being used. I think we should do more with the with the 3-

D technology or, you know, all these. But it's kind of it's so amazing, so amazing to have all this energy to be used to catch fish that actually being used for landfill or you to the topsides at homes, etc. So it's amazing opportunity to change that behaviour. So even though we talk about illegal fishing, we have a responsibility as well in the developed countries to do much better than we've done so far. And so I think that is a, we can sort of look at ourselves and say we are responsible.

**Lukxmi Balathasan** [00:14:26] Yeah. And I guess all of you just talked about how technology is going to have this great positive impact. And you talked about block chain and how that's going to bring traceability, transparency to food chain. But I guess there's always tech for good, but there's always taking things a bit too far. I'd be really interested to hear from your perspective, like how do we ensure that all this positive impact we're having tech stays positive and that how do we mitigate against the negative impact? For example, if we get really used to technology to be able to find fish more efficiently, how do we make sure that it doesn't go too far and that further on continue on with overfishing?

**Hordur Kristinsson** [00:15:01] Well, I can take fishing, for example. I mean, people can see it as negative if you if you develop extremely efficient fishing gear, which you can catch a lot of fish at one time, but if you have a quota system, then there's nothing wrong with it because you you're putting less energy into the fishery, catching you, using less oil, for example. So, I mean, there are two ways to look at that coin. So I think in terms of fishing, yes, that has to be regulated. And I would love for us not to throw any heads into the ocean. But, you know, the time will eventually come, I think. And we could use innovative technologies like showing us today the 3D food printing. You can actually take that cod head and you can separate out the meat and you can print it and you can actually make a filet out of the meat that's in the Carp, for example, and thats only got three fatty acids that were in the Carp head, just an example.

**Lukxmi Balathasan** [00:15:47] And I think another thing that we you know, we talked about technology and regulation is consumers are demanding more and we're getting more visibility in terms of where they're beaten sort of vegetable patches come from. But there is sort of less visibility with in the food and seafood industry. So, you know, as you talked about the technology that you're using, that it's bringing more visibility, why is that? Why is it turned out there hasn't been much visibility and transparency in the fishery sector?

**Thor Sigfusson** [00:16:14] I am a little bit worried that many of the start-ups that we have that have been dealing with traceability, all kinds of ways to make the culture more aware of what the product is that's on the table in the supermarket. The problem is that the often even though we think it's otherwise, many supermarkets say consumers are not willing to pay at all for any of that. And so we're actually kind of stuck with all this beautiful technology. But the industry is telling us that no one is willing to pay an extra dime for more traceability, what have you. Of course, this might change. But this is just a case of this as it is today. The other thing is when I worry a little bit about the courses, that there's a lot of gene modification in fish farming right now, not talking about the toxics, but Tilapia, which is actually competing with our white fish. We're learning that they're actually doing a lot of gene modification there. And I don't know what else they might be doing. So the customer awareness is, of course, a huge issue for us. But we're also having a difficulty, I think, with quality fish. Consumers don't know what a quality fish is often, that I mean, the US, which I've been so often too. They love fish nuggets. We don't have fish nuggets. When I was studying in the U.S, my family sent me like my Greek friend, actually, the whole filets and whole fish to have in my freezer in it where we were living. And my

American friends always said, can I look into your fridge? And I said, Why is that? I have never seen any refrigerator with these types of whole fish. We eat fish nuggets. So they had never seen, I'm overstating here. But the fact is this is our challenge as well, to get the consumers and the whole public more aware of the quality. What is quality and what should they be asking for in terms of the sources that come, bring the fish.

**Matt Eastland** [00:18:13] And so how do we do that? You know, is it you know, what kind of technology is being developed to kind of improve that awareness? And is there a role for start-ups maybe in this space to kind of to do that or fill that?

**Thor Sigfusson** [00:18:26] I think that's a huge role for start-ups. But once again, even though I'm always talking about tech, the main thing is the awareness of the people. We need to bring that up. We need to show people and educate the consumers, the industry, and make it more of a... Make more interest amongst the public about these issues.

**Lukxmi Balathasan** [00:18:49] Because you talked a lot about value in your talk, and I wonder, is it because consumers are really disconnected about where their food comes from and don't really appreciate the effort that goes into you, attaining their food for them. And you think that aspect has a place to play and increasing the value for food for consumers?

**Thor Sigfusson** [00:19:09] I don't want to steal the scene here. I think it is the wallet. It's basically the wallet. New people are just looking at their wallets as a what if it's cheaper than I'm an organic type. But this time I'm not buying into it. I had to do a little bit cheaper because of the economic situation. What have you. So it's a very much a matter of economics.

**Hordur Kristinsson** [00:19:30] Like Thor said, a lot of the actually we're done that we did a pilot actually here in the U.K. We developed an app, years ago at Matus. I think twenty eleven or twenty twelve with a big supermarket chain here in the UK. App worked perfectly. You could scan the fish. You could even see the picture of the boat, even the picture of a fisherman. You can you can link whatever with the app, recipes and things like that. But the supermarket didn't want adopt it. They didn't want to give away too much information, actually. So which was interesting, not just about the you know, it costs more, but there's a lot of other fish in their counter which may not have a pretty as pretty story as the fish, you know, we were displaying. So like the Tilapia or something else.

**Isabel Hoffman** [00:20:07] So this is exactly the problem. This is exactly what Matt, to the question you ask. So how do we get there was going to regulate it because the retailers are not that convinced that they should give that information.

**Matt Eastland** [00:20:22] Interesting.

**Isabel Hoffman** [00:20:23] But I mean, the consumer is creating that pressure. And we see the millennials are completely different. They want to know it. So it will change and they'll be probably a courageous supermarket retailer that will say, you know, I'm gonna make this stuff completely transparent. I think it was too early two thousand and eleven. Yeah.

**Matt Eastland** [00:20:44] Ahead of your time Hordur, ahead of your time.

**Hordur Kristinsson** [00:20:45] The other thing that I like with actually this story is the problem was that it was beautifully frozen from the beginning. But when the restaurant had it like fish and chips restaurant and the QR code said this was caught six weeks ago. It's like people don't like to know about it. Even they are sort of it's like an old fish. So we were really proud to having all the information, but the information was something that the consumer didn't really want.

**Isabel Hoffman** [00:21:11] But this is what I see the difference in terms of the millennials. I mean, I happen to be a mother of a twenty-year-old, and I see my kid has our own Start-Up while doing university. And I'm having lunch with her and dun dun dun in a phone. Phone is a computer, in fact. And she's not sending messages. She's doing business. So and it's this while doing a conversation while talking with someone else and why whatever. And this multitasking is not happening in our generation. And these guys, they want to know. They want to know. They do. They want to mine data. They want to know what it comes from. Those are the guys I believe are going to change.

**Thor Sigfusson** [00:21:48] I love that story. My son is eating Kentucky Fried Chicken in Reykjavik.

**All** [00:21:53] Ahahahaaha.

**Thor Sigfusson** [00:21:53] So I guess you're somewhat superior to me.

**Lukxmi Balathasan** [00:21:58] So we talked quite a bit about the source of fish from the oceans. But, you know, the ocean has a diverse ecosystem. We're seeing a big push now towards plant-based diets. I know Hordur you mentioned our Argyle's briefly, but you talked about it from a supplement point of view. So do you think there's more that we can do, like farming the oceans to supplement this growing need for plant based diet? Any trends you're seeing there?

**Hordur Kristinsson** [00:22:21] Absolutely. Seaweed is a big, big trend in so many different varieties that we could, we can use. They vary a lot in protein content, fat content. So, yeah, if you can find a source that you can you can culture that. That's a fantastic plant based marine plant based source of protein. You can develop for the future. Same with the microalgae. A lot of companies now putting really putting up efforts to grow microalgae on a mass scale so they can. So they are the next Alternative proteins, the next alternative omega three fatty acids, for example. So, yeah, they're they're huge, huge opportunities. It's interesting with the seaweed, for example, you've got to be careful. Seaweed is also a habitat for fish. So you've got to harvest seaweed just like you would harvest fish. You've got to make sure you don't overharvest the areas.

**Matt Eastland** [00:23:11] And sort of staying on that sort of future topic, Hordur, sort of, you know. So you mentioned in your presentation about companies which now sort of printing, you know, fish. And I know that Finless Foods is now doing the first lab-grown clean fish. So can you imagine a future where we're simply growing or printing our own fish? And actually we just kind of leave the oceans alone.

**Hordur Kristinsson** [00:23:35] That would be far, I think, very far in the future that if that ever happens, I think it's going to coexist. Technology, high tech foods are always going to coexist with, you know, the more traditional foods. And it really depends on the consumer preference. So I believe both are going to coexist for quite some time. And we're not going

to have the food replicator yet that you saw on Star Trek. I don't know if you've seen Star Trek. You press a button and you get the food.

**Matt Eastland** [00:23:59] I'm sure its coming.

**Hordur Kristinsson** [00:24:00] But I didn't know I would have an iPhone when I was growing up. So who knows? One hundred years.

**Lukxmi Balathasan** [00:24:05] And you know Thor you know, for you, a big focus is on how the fishing community can embrace technology. So where you see the future of traditional fishermen, fishing communities. What is your prediction of how the current community will look like in about twenty years time?

**Thor Sigfusson** [00:24:19] I think what's actually happened we have some examples now in Iceland of fishermen that fisheries, families, they tend to keep everything in their families, which is OK. But fisheries, families that are actually moving into these pharmaceutical level industries. And I think the challenge is going to be are you going to take the step or does it need the new generation. I in some ways think that we need the new generation. Because we tend to be sort of all in our own boxes, even though we don't like to admit it. So the next generation is going to take the challenge. And given the fact that this new generation is educating themselves, this is going to happen. And I feel it so strongly in Iceland that we've been able to display in the media these new products, even for Icelanders. Some of what Hordur has been saying and myself here is new to many Icelanders. But they have come back to us from the new generation in Iceland and saying, I'm actually from a fisheries family, I had no idea you could do all these things with with our fish, so I want to come back into the industry. So I think we'll see the pharmaceutical part grow quite fast in the most successful fishing nations in the world, but we still have to tackle the basic fisheries and what's going to happen is that we're still going to see processes moving to developing countries, which is kind of sad, mainly because the energy that is being used to transport the fish. But the good thing is technology is helping us a lot now and only in two thousand and fourteen, the technology then was for each processor being able to do eighty kilos of fish filets an hour, in two thousand and seventeen it nearly doubled. So the technology is just moving so extremely fast with laser technology and all kinds of things that we're hoping that this means that we can actually do the whole processing in the local community in the future. So we hope we can, with technology, assist these communities to build their own industries or rather than having to export everything abroad and then bring it back in the fish nuggets form. That is sad in many ways.

**Matt Eastland** [00:26:43] Thank you, guys. So I think, guys, we completely run out of time. So thank you so much, everyone. So this has been The Food Fight. If you want to get in touch with us go to our website so its [eitfood.eu/podcast](http://eitfood.eu/podcast) or you just want to have a chat with us we're at [podcast@eitfood.eu](mailto:podcast@eitfood.eu). But just to say amazing panel. Really interesting discussion, guys. So thank you very much. Big round of applause please.