

2016 Conference Transcription

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Moderator	Kate Chapell
Speakers	Carlo Buontempo, Kirsty Lewis, Alice Bell
Notes	n/a

Intro	<p>Hello and welcome to FutureEverything's 2016 festival podcast series. Over two days, in Manchester's iconic Town Hall, we tasked designers, artists, scientists, and many more, to rethink our resources. From life, earth and intelligence, to community and uncertainty, our speakers ask what we might need less, and more of, in our near future.</p> <p>In this panel discussion we hear Carlo Buontempo, Kirsty Lewis, Alice Bell further discuss earth as a resource.</p>
Kate Chapell	<p>Great, and I'm going to use my prerogative as moderator to ask the first question. Kirsty showed the slides of those global scenarios, the pictures of the globes, and I'd like to ask each of you which you think is the most likely scenario were going to be in in 2050 and 2080. Carlo?</p>
Carlo Buontempo	<p>What a question to start with. Well, in a sense my expertise is on the climate side, and I think a lot of this depends on the decisions that are beyond the climate, is this morning, in the first presentation, I think we were shown the former Prime Minister of Uruguay mentioning this as being a political problem, a political challenge, and I think that's very much what they mentioned. So the science is quite clear, as science can be. It can improve our understanding of the climate system. We can reduce uncertainty, but the fundamentals of the science are quite solid, and [inaudible 01:59]. So in a sense, the question is for the politician to ask, which route do we want to take? Which is the possibility, the sort of environment you want to live in and you want our kids to live in? And this is an entirely political question, political and economical question, so it's difficult to attach probabilities to these scenarios, and I don't think it is entirely within my area of expertise to make that judgement.</p>

Kate Chapell	Would you mind if I pushed you on that? Based on the experience you've seen of politicians' response to date, which do you think of those scenarios is the most likely, not in a very well-defined probabilistic sense, but just your gut feeling?
Alice Bell	You can answer as a human as well as a scientist.
Kate Chapell	Yes, exactly.
Carlo Buontempo	Well, clearly I have my point of view, but it's difficult. I'm a scientist and I'm responding as a scientist, so I should maintain my personal point of view. I'm more than happy to talk through my point of view on a personal level, but as a representative of the Met Office, I don't think I can. What I can say though is that we have seen a change. If you look at the way humanity has done this process; in a sense, again, I was making the example before that in climate we went from a phase in which the past was a good representation of the future, to a phase in which the past is no longer a good representation of the future. Maybe the same can apply to decision making. The fact that we have seen in action in the face of clear evidence, doesn't necessarily mean that going forward we can we cannot see action and reaction to this information.
Kate Chapell	Okay, thank you very much. Kirsty?

Kirsty Lewis	<p>I suppose, in some ways, as a scientist, you have to look dispassionate, because you want people to take your advice as fair advice and that you're not adding your values into that. But at the same time, you can't not look at that information, especially the area I look at; [inaudible 04:06], but the human outcomes, when you realise you're talking about tens of millions of people being flooded, and we're talking about working with the World Food Programme, on the frontline feeding those people. So I think about it as a climate model output, and they think about it as people that they've met that they brought food to. So actually, it can lead you to be extremely pessimistic. I definitely couldn't say what was more likely, but I can say that I've always felt quite pessimistic, I suppose, and also because my concern has always been that we try to be very neutral and very scientific about the results, but are we failing in our response to tell people how serious this problem is, how big it is? And so I've tried to maintain it based on the facts, but be clear; this is a huge challenge. But I have to say in the last year, and even hearing Alice's talk, and going to the climate negotiations, and seeing them get the deal, I feel a lot more optimistic that there's more going on now, that people are understanding how big a challenge it is, and actually that day to day, when I speak to people, I don't hear people being sceptical or getting stuck in this argument about whether it's happening or not, they're asking about what will happen. And once you start asking that kind of question, then we have got a chance to move to a better future.</p>
Kate Chapell	Thank you. Alice?
Alice Bell	<p>Yeah, as an ex-academic and journalist and current charity worker, I am also limited on the whole... this is a personal opinion, so you know, don't complain to my boss about this, but my gut reaction, from the work I do in renewable energy now, my work as a journalist before that, and also previously to that as an academic, as you said, there is a sort of new action, I think we have really turned a corner where those sort of questions about are we going to do anything, where you felt a bit like you were walking through this quagmire, it's kind of change, I feel like there is this new positivity, and we're going to get on with it and roll our sleeves up and just get on with it now. But I think we are a bit late, and I still don't think we're going to do it fast enough. So I think in terms of what degrees within that, kind of whether we have the extreme danger, or it's okay, I think we'll decarbonise, but not quite well enough to save everybody, and it's going to be touch... I think we will decarbonise and we should not be disheartened by the fact that we're not going to save the planet entirely, and save everyone and give up, we should keep going. Even when I'm most depressed about this I still say there's so much more of the world to save, even with the stuff we've lost, there is still so much that we can do, and the only way to speed it up is to get on with it and not to be depressed and not do anything.</p>

Kirsty Lewis	I was going to say I think you're absolutely right there. One of the things we see in our climate model, is even though we're committed to a certain amount, you can't give up, because it makes such a big difference between eventual outcomes towards the end of the century if you start taking action on whether it makes a difference.
Alice Bell	But if you're worried about us not doing enough, that's an actual reason to go out there and do more, but at the same time there's also the question about adaptation, because we're not going to save everything, it's not going to be the same. We do need to adapt too. How much finance will go towards that and how many actions will go towards that? I think we'll be quite unevenly distributed. And one of the good things that came out of Copenhagen... we talk about this real low point happening at the Copenhagen talks about five or six years ago. Actually, one of the good things that came out of that were mechanisms for sharing, funds for adaptation and mitigation and a green finance fund, which would be able to distribute some of the inequalities of power that we have in the world, so that countries that are most affected and least responsible will be able to tackle climate change. That hasn't got to the level yet where I think we have a distribution of wealth that will allow us to have a fair and equal way of adapting, but it's getting there, and there's scope there for a lot of action too, and so one of the things I think we could all do as citizens is lobby our politicians to have greater contributions to things like the Green Climate Fund for rich countries like Britain or America or Germany.
Carlo Buontempo	I'll just try to be a bit more optimistic and give you a bit more of an answer to your question. I think we have also seen a lot of important shifts on the horizon over the last maybe ten years, and that's been the involvement of companies into the assessment of the impact the climate will have on their business, has actually changed the conversations quite significantly. I remember one of the first studies we did on climate impact in the Met Office, the discussion with the company was basically how to green their business, how to look a bit more environmentally friendly, especially energy companies, and the discussion now in this applied science project is entirely down to impact of climate change on their operation. And having this conversation means that those that can potentially be playing a negative role in the conversation about environment actually become an active part in the conversation and they understand first-hand what climate change can mean for them and their business. So I think this has been an important change in the discussion around this.
Alice Bell	There are very few companies that are entirely wedded to fossil fuels, very few, and even in the energy companies not all of them are, and they're increasingly looking really isolated in terms of action on climate change.

Kate Chapelle	Thank you for that. I'm going to ask a question from Twitter then come to a question from the room. Kirsty, this one was for you; we need more robust agricultural systems, how do you propose we do this to make long-term yield increases? And that was a question from Aspen Glencross.
Kirsty Lewis	Yield is just one, so that is traditionally where climate science has been focused; how does average yield change? And it's this robust, resilience question that we're asking now about this variability. So I can answer in terms of what agricultural changes you need to make, but in terms of the information we're trying to provide from the climate science, is we're looking at whether these systems are linked. So I show the maize concentration in the USA and China, and actually what we're looking at now is are they meteorologically linked? And it does look... initial research is just that maybe actually they're anti-correlators, so there may be more resilience in that system than we think. So the first step is just understanding whether there's actually a physical mechanism that means a good yield year in one part of the world, or a bad year in one part of the world will corresponded to a good yield in another part of the world. We just don't know, I think this is the problem. We have no idea what level of risk we're carrying, we only know what actually happened in the last thirty years over a period where our cropping systems have changed significantly, so we're not sure how useful that information is. We don't know what the climate could bring, so what's the low probability, high-impact event? And that's really where that research is. And I think if we can provide information we can start looking at where should we be investing in improving yields.
Kate Chapell	I've just got a very quick follow-up. I can see loads of hands, but excuse me. To what extent do you think the slides that Alice showed about community energy could be replicated with community food growing initiatives? I know of many, many in Greater Manchester... would that have an impact on food security across the world? Or enough of an impact? Would it have a small impact? Do you have any sense of that? A very brief answer from each of you?
Kirsty Lewis	I think it's a balance, because if you're entirely dependent on your local production, when we saw the Sub-Sahara example, the real issue there is that they can't mitigate any of their risk by trading elsewhere. If you've got a very, highly volatile, variability climate, you don't want to put all your eggs in one basket. So growing locally is important, so you're not dependent on imported crops, but you need to be able to access the market as well to off-set some of the risk as we've seen. So if you grow it in one place you're less likely to get hit by climate change because you're only in one location, but if that's your food source that would be devastating.

Kate Chapell	Thank you. From the floor please. The gentleman in the middle.
Question 1	<p>Firstly thank you very much for really informative talks, and particularly Alice's really, to have that message of positivity being spread, I think, is really important. But I guess the question is to what extent to people need a positive message to be spread? To what extent do we need to sort of show people that the really damaging impact of climate change happening around the world, how do we get people to change behaviour and to really think that their actions can have the sort of impacts that might stop these things happening? For example, the recent floods that have occurred and people have been really impacted by, would it be possible to say that these were down to people's behaviour? Can you really frame that debate in terms of people can work to change this and make it happen less, rather than saying 'these floods have been really damaging'? I guess is the science there to say 'these were due to climate change' and if so, is that a way of framing it that would change behaviour? Or do you think it's the positivity that people need?</p>
Kate Chapell	Thank you, that's great. Who'd like to start on that one? Carlo?
Carlo Buontempo	<p>Well, a quick reflection on what his question means in terms of science in some respect; part of your question, if I got it right, is about tradition. So you see the flooding, you see the tractor storm, you see 'is this climate change?' can we say with some level of certainty that that was attributable to climate change? That we can link the action of people to a specific event? If you look at the science over the last few years there's been a lot of effort in improving our ability to associate specific events to climate change, it's becoming very difficult. It needs to be done in a statistical way. As Kirsty was mentioning, we refer to thirty year averages as a climate, so you cannot pinpoint a single event to climate change as such, but you can say that certain kinds of events such as the flooding that you're referring to are more likely because of climate change, and you can attach a number to that, and it's quite important than framing the discussion around the action of people and the impact they're having on the environment.</p>

Kirsty Lewis	<p>I think the negatively of the message; I think we're beginning to learn as climate scientists if you're just relentlessly negative about all the awful things that are happening, it really turns people off. They feel completely disassociated with this big global picture, so the tragedy of the commons, you know, we all own the atmosphere, not one person can do it, make a change on their own. So I think this community level engagement is what's important, and it's important to be honest about the pros and cons and it's just a change in the system. So we have to be careful, we need to say the warning message about what we see in the climate science, but we have to be careful that we're not disengaging people, particularly on an individual level, who feel helpless in the face of this huge change.</p>
Alice Bell	<p>So there's several parts to that question. One is how people respond to direct experience, so that could be the positive experience of installing some solar on their roof, or it could be a more negative experience of flooding, which they, for whatever reason, associate with climate change. And we know that both of those things are very powerful. So one of the things if you look at public attitudes to climate change and whether we should take action on it, the floods two years ago seemed to have quite an impact on the British public. Already the British public generally believe in climate change and that we should do something about it. You may not think it from our press, but the British public are pretty on board with it already, but they were more on board with it after the floods. I think if you did a similar study in Manchester and Yorkshire just now, you'd probably find it increased again, and that comes from direct experience. I think that makes sense to me in terms of my background in science education, that makes sense, but I think we can't just rely on that, because you've got so much stuff about predictions in the future or the important work that we've just seen presented. We need to find ways to allow people to engage with that before it actually hits.</p> <p>But then there's also the positive and negative thing, and I think you can get a lot of debates in climate communications about which one is better, and you get a lot of people who are like devoted to one or the other, just sort of clash, and it's not helpful, I think we need both. And I think that's accurate, as well as the fact that it's probably the most practical in terms of wanting to have behavioural change, but also I think it's true that there are positive and negative sides to it. So there are fewer days where I work on renewable energy than when I worked in climate change where I sort of crawl under my desk with the pessimism of it, you just read this new report and it's just so disabling. But I still feel that that moment of crawling under my desk and feeling disabled has a long-term impact on my devotion to climate change. The fact that I spent too many days hiding under my desk at Imperial College is one of the reasons I now work full-time in this area, but at the same time, the reason I get up in the morning is because I can help a school put solar on their roofs, and it's a balance of both really. I'm really proud to work for an organisation that focuses on the positive, but if that's all that was out there, I think we wouldn't have an accurate vision of the world, and I still think it would be dangerous because of that accuracy, and we probably would be complacent as well. So yeah, research would back that up.</p>

	<p>There's a really good organisation, it used to be called COIN, Climate Outreach, I think, they're called now, that do a lot of research on this stuff, and they'd probably say 'you want a mix of both, you've got data to suggest that both are enabling' and the same, if you like, at academic work. University of Cardiff has got some really good data on this sort of stuff, and again, you sort of see a mixture of these things, and they've also got some of the best research on the impact of the floods if anyone wants to read any more on that kind of thing.</p>
Kate Chapell	<p>Thank you, can I take another question from the floor at the back?</p>
Question 2	<p>Thank you. I've written my question down. Committing to energy change like solar panels and wind farms are really sexy actually, far more sexy than telling people to switch off a light switch. How do we encourage small businesses? So I'm not talking about the big corporates who have got the big energy levels that they need to demonstrate that they're reducing carbon. How do we get smaller businesses and households to take reduction seriously? How do we make that sexy?</p>
Alice Bell	<p>I think we need to stop saying that demand reduction isn't sexy. I think energy efficiency is really sexy. And I think we need to just go around saying that and it will probably happen. Because a lot of people say that wind farms aren't, and lots of people think it is. With energy efficiency, it's always 'oh, it's the poor relation'. In fact, I know an organisation that does a lot of work on trying to get people to reduce their use of energy through solar panels. You use the solar panels are the bait to get people in and then you talk to them about insulation. And I think we need to get to the point where we're using the insulation as the bait. Insulation is great, it keeps you warm, it's good. People like the idea of not wasting stuff. I think that there will be a kind of epiphany, people who find that a tech element is a really engaging thing for them and makes it sexy, then one of the big things that's going to happen to energy in the next few years is the increased digitisation of it. At the moment our energy system is still really analogue considering it's the twenty first century, but it's about to get much more digitalised, and we will see a lot more stuff on that.</p> <p>We're doing some work with a couple of communities in the UK at the moment with smart meters, and some of the people just get really geekily into it, and we're helping them link up to local renewable systems. So if they use energy at different times in the day, it's cheaper, and they can see that and so they can change when they use their demand as well as decreasing it. So I think that might be something that will help small businesses and households, because that kind of technology will probably be quite accessible, and the whole infrastructure that's already set up in terms of our builds and things will encourage us to do that because you'll see our energy providers encouraging us to have a smart meter and giving us discount if we do that. So I think that will be one of the things that will happen, but I think also there's people who work in energy need to stop saying 'oh energy efficiency is boring' because it's not. It's really fun.</p>

Female audience member	[Brief comment or question from audience, inaudible 20:49].
Female	<p>You're right, yeah, it isn't as visible, but you can do the two together, and some of the best projects do put both of them together as well. So you have loads of community, loads of council-based work has solar panels on social housing, for example, and the money they generation from that for doing energy efficiency work, replacing boilers, and you can make it visible. You could do a lot more work to make it visible, so it's not necessarily on our roofs. The fact that it's not visible is one of the things that people like. Some people don't like the visibility of renewable energy. So we could just talk more about it, we could just tell more stories about like this woman that we came across for a project we were doing recently that said that the energy efficiency measures and the access to solar power meant that she could afford to buy her children Christmas presents. It had such an impact on her life, and it's like if you're doing projects that are having that kind of impact on people's lives we should celebrate that.</p> <p>These things are happening all over the country, and if we celebrate that, that will be a way of making it more visible. So yeah, I do take your point that a boiler inside someone's house or some insulation is not the same as a roof, and politicians don't get to have the photograph taken with it in the same way, but we should stand up for how important and wonderful the stories of action on energy efficiency are, because they are.</p>
Kate Chapell	Thank you, question at the back?
Question 3	Hi, I was just wondering, it seems like one of the most useful tools for mitigating the risks of food security is the weather prediction models that people like Carlos are working with. To what extent has ownership of those tools been politicised, and is there anything being done to make sure that those tools aren't just owned by more powerful countries and used in a political way in the future against less powerful countries?
Kirsty Lewis	Because my experience of it, I don't have any experience of being politicised. I suppose one of the things that I discovered when I first started this work, I found really shocking working with the World Food Programme, is I think one of the questions I put up was 'can we feed a future population of nine billion?' was the question under climate change, and actually what we didn't realise is one of the answers is we can feed a population of nine billion now, today, we grow enough food for nine billion people, and yet we have around eight hundred million people malnourished in the present day. So it's not just about the availability of the food, it is about the information, it's about the system, so it's the access to that food that's also important. So there is clearly a political element in the sense

	<p>that the inequity of the distribution of the impacts of climate change, and the inequity of the distribution of the information about how you prepare for climate change... I'm not sure how you stop it being politicised. I mean it's working with people like the World Food Programme, the fact that we tried to make all of this open source, and I haven't had any experience of people politicising that, and looking at it alongside the sustainable development goals, yeah.</p>
<p>Carlo Buontempo</p>	<p>I think a different part of your question is about the technical gap and the fact that it's generating inequality, if I got it right, on a global level. And in that sense, I think, you're quite right. If you look at the fact that the global model we use for the climate protections or for climate protection is a global model that has been developed over forty years and is now probably a few million lines of code. The amount of energy and investment that this country has put into it is incredible, and although we all hope for a more equal world, it will take decades, even in the best case scenario, for a developing country to reach anything like what we have now. So there is that inequalities, it's inevitable. Now the UK are distinct, the UK is one of the few countries, you're talking about a handful, maybe ten, fifteen countries who have real global model capability. Some may catch up more rapidly than others, but this divide will stay in the near future. So the question is how do we make information available and usable more widely? And in a sense, there are good steps in the open data, in the direction of open data, the European Commission is investing very heavily into making climate information, climate services, publicly available so that businesses can make the information usable and this will be free for anyone to use. So there is a movement in the direction, that once we solve the technological gap, we'll make the access to the data available to everyone.</p>
<p>Kate Chapell</p>	<p>Thank you. I'll take another question that came via Twitter, and this one was from Zoe Breen. Renewable energy technology has been around for twenty plus years. Why has it taken so long for people and communities to adopt then? Alice?</p>
<p>Alice Bell</p>	<p>It's been around for a lot longer than that. Solar, I suppose, is twenty years old in the UK, but around for longer. So solar kind of petered around the nineties and didn't really do anything, and the thing that really sparked deployment of solar in the UK, was the feed-in tariff, which was just a policy. It was a subsidy which gave people money for feeding the excess energy that they had into the grid. That is the thing that would allow all these different projects to grow. It was an incentive, so if you did own your own roof, you could buy some solar panels. It was an outlay of a few grand, you could get them installed, but you pay that off very quickly because of the feed-in tariff. That has been drastically cut this summer. So if you look at the data on how much renewable energy is being deployed in the UK, especially with solar, it's just been going whoosh in the last decade and it's just going to go like, it's just going to fall off a cliff.</p> <p>We've already seen solar companies across the UK going completely bust, and that's the impact of policy. It's worth bearing in mind that at the same time the oil and gas and coal, well fossil fuels, well coal's more complicated, but fossil fuels as a whole are heavily subsidised by the UK government. In fact, some recent</p>

	<p>data suggests they're the only government in the G20 I think, well, rare as a country that has increased our fossil fuel subsidies despite sort of commitments in Paris and things like that. So policy makes a big difference, incentives like that. I think in a few years we're not going to need those incentives now, because one of the reasons why deployment was slow is they're expensive. We spent hundreds of years, and we know this very well in Manchester, are developing a fossil fuel-based economy. The idea that we'd quickly be able to have those technologies at mass production level that makes them cheap, even aside from other issues like storage, is kind of ridiculous to expect them to be that quick. But we are getting there. Solar particularly will not need any subsidies. It will be so cheap pretty soon with storage that will allow us to use it at different times of the year. So yeah, there's partly the technological question which is happening rapidly, but it's also an issue of the policy context, and it's a real shame that in the UK we've just kind of wrecked a policy that was working.</p>
Kate Chapell	Question from the gentleman with the scarf?
Question 4	<p>Hi, my name's Anthony. I have a question about the model. You mentioned that the population will not grow in East Asia. Does that take into account the one child policy cancelation in China? And second, do you take into account the acidification of the oceans? So everything is taken into account?</p>
Kirsty Lewis	<p>The population change, yes, does account for the one child policy, that's one of the reasons why the population projection shows slight decline in East Asia. The acidification of the oceans; in terms of taking into account, I mean it's something that we understand is happening.</p> <p>What is not so understood is what the impact will be on fisheries. We understand that the warming ocean temperatures will affect fish, so we have a better understanding of the threat to fish stocks as well as warming waters, particularly in the tropics where it's already warm, that can be quite devastating, and coral bleaching is another issue around that. Ocean acidification, it's a bit harder to know how that will affect the whole life cycle.</p> <p>So this is not my area of expertise, but certainly we will include information that's an identified threat. So it's something where we don't always understand exactly what will happen, but we want to point out is you're dependent on fish in this region of the world, and we know this is happening, and it could potentially have unexpected consequences. So you understand that this is on your risk radar, if you like. But we don't have clear depictions about what that will mean for fish stocks, but it's a risk that we're carrying and we have absolutely no idea what the consequences will be.</p>
Kate Chapell	Thank you, we've got about five minutes left so if you can keep the questions and your answers pretty brief and we can spend a couple of minutes.

<p>Question 5</p>	<p>Hello, I'm Alice Sharpe. I'm director of an organisation where we work between artists and scientists on climate change called 'Invisible Dust', and someone earlier mentioned about people changing their behaviour, and when you see the slide panels that you just put forward, I mean, I've seen a lot of climate science, but every time it does hit you in a very strong way. And yet, when we were having debates, we had a film called 'Deep Above' by an artist called Adam Chodzko which was launched in November, all about the psychology and why we're not changing our behaviour with climate change, and the speakers in the debates that we had said that during the floods only seven percent of UK media mentioned climate change in respect to the floods that were happening, and that was actually the person that Alice mentioned; Climate Outreach, it was Adam Corner.</p> <p>So the problem is that these statistics and facts, as most people here probably know, are not being put out by the national media. People don't know about them. And I know that, Carlos, you mentioned the project here you're doing with FutureEverything that maybe artists do have a very strong role to play in trying to inform the public, getting people to see things in maybe a different way than maybe the scientists can put forward. Scientists are restricted in the way they have to be very objective in their materials. Artists can be political, they can be humorous, they can look at things in different ways. So I just wanted to sort of ask you all what you felt about the role of artists in this area?</p>
<p>Carlo Buontempo</p>	<p>Well, okay, I'm a great advocate of engaging with artists. I've been working with artists for probably a decade now. I think it's very important because we only have a scientist set of competencies and I think it's very useful to have a different take on the same matter we work on. There was an interesting debate this morning at the fireside chat about the role of visualiser and artist in the data, and I don't think the role of the artist is just to visualise and to make the data look nice. I think it's much deeper than that. The other side, which I found interesting, is the fact that scientists tend to hold onto the data and tend to be the owner of the data, and are not normally happy to... they want to keep control in some sense of the data they so difficultly put together. So I think there is a caveat there. So we should engage with the artist, but we should attach to the data sufficient metadata to make transparent what the data is, how it's been put together, who needs to be credited for that data and so on. But once that is done, I think that it should be publicly available, usable by everyone, even in the wrong way, you know, whatever it means.</p>
<p>Kirsty Lewis</p>	<p>I completely agree, this stuff's really important. I don't have experience of working with artists, but because I'm looking at the kind of human end of the climate change projections, I have to do a lot of work across different disciplines. So it's usually me looking at that climate data and the climate science working with someone who understands; well, what does that mean for food security, or trade, or some kind of human dimension to that sort of conflict or migration? And we've found that a really powerful combination actually, so you hear both colour, and I only ask the question about what we should do, feeling very restrained about, well, we need to maintain our objectivity so we don't undermine the confidence people have in what we say, and we don't want to lead people without our own values. But these are not value-free, the information will affect</p>

	<p>people. So by working together, exactly as you said, the person I'm working with, the World Food Programme can say 'this is an emergency, this is a disaster' whereas I can say 'this is a change in the availability of food.' So I can give some numbers and some transparency for the science behind that and then they can say what they need to say, and what that means for us, and that's a really important combination so that you can trust the science, you don't feel they're manipulated into what they should think, but they can hear some interpretation of what that means, and I think that's really powerful together, and I think we need to be doing more of that, because I do think we quite often miss people understanding what this really means for them because we do it in such an objective way, but it's very important that we protect that objectivity as well.</p>
<p>Alice Bell</p>	<p>Yeah, I think we should have more of it, as I said. And I think the important thing that we need, rather than go over why it's important, because I think there are multiple reasons why they are probably in agreement that what we need to do is find more ways to mobilise, more ways to finance that, because we can't expect the artists to work for free. And we've seen in biomedicine a reasonably large, although it could be larger, pot of money developed for arts and science collaboration through the Wellcome Trust, and they see that as part of making science is to allow the scientist to work with the artist. Part of doing science is sharing it, and art is one of the ways you share it, alongside lots of other public engagement methods and technologies and bearers of expertise. And they see that as part of what their big money bag, that they put to do science, some of that goes for. And I'd like to see the research councils do that.</p> <p>One option is we just have a rich benefactor for climate change, maybe one of the groups that spend a lot of money on that, they could give money for an arts/science collaboration prize, but I'd actually like to see the research councils do it. There's this thing like 'oh, we need to spend the money on research. More science is good science' but actually, we do also need to share that science with other people, and that will make the science better and also allow us to deal with that science more effectively. It's not always popular when I say that sitting next to scientists, but yeah, I would like to see major amounts of our science funding shifted towards working with artists, and other media organisations. Another thing the Wellcome Trust does is invest a lot in writing and media themselves, and improving our kind of science media and biomedicine, and we're kind of missing that when it comes to climate change because there isn't a Wellcome Trust money bag for that.</p>
<p>Kate Chapell</p>	<p>We'll give you a chance to respond to that.</p>
<p>Kirsty Lewis</p>	<p>I don't think you would disagree, I mean, obviously, I'm never going to fit with you in many ways on science, but on the other hand, we do face all the time being challenged; 'when are you going to know what's happening in the future?' We're never going to know. It's a complex, uncertain future. It's how you interpret it and use that information. So I absolutely agree, a huge amount of more work needs to be done in interpreting and making accessible the science,</p>

	because we do know an awful lot already, we just tend to present it in scientific statistical terms that aren't accessible.
Alice Bell	I agree, yeah.
Carlo Buontempo	As I was saying, the UK Commission is investing heavily into climate services, and climate services, not just climate knowledge and climate science, it's really making that transition, making the information actionable. And if you want information to be actionable you need to go and reach all sorts of different skills sets and capabilities, and art is certainly one of those.
Kirsty Lewis	And the Met Office does actually do this reasonably well. I'm maybe thinking of the research councils, but yeah.
Kate Chapell	Okay, I've had a couple more questions from Twitter, then one final one in the room then we wrap up. As mentioned, quantified energy makes energy sexy. How about quantified food? Why isn't there much more info about our food? And there's another one. I've heard that a number of companies control food production, is this a real threat and can we combat it? So why isn't there more info about food, and to what extent do companies control?
Kirsty Lewis	I think it's just further down that line. We're only just starting to engage in the relationship between environment and food security, that risk climate and climate change and translating it into food systems output I think the roles of companies is really important because... I've been doing a lot of work recently with China where it's very government-controlled and they hold a lot of stock, so they manage a lot of this risk by holding huge... eighty percent of annual consumption is held in stocks there, but in Europe and North America it's something more like fifteen, twenty percent, and most of it's held by companies. And so we do have to engage with food producers, distributors, and retailers, and actually they are asking more and more questions, I suppose, as we're saying, they're starting to see that they are going to be directly affected by these

	<p>impacts, so their business models are going to be affected. So they are starting to ask this information, so it's beginning to open out a bit more, I think.</p>
Alice Bell	<p>We are obviously seeing more spaces for citizen action on learning, and knowledge-based stuff around food. So not all of them are that great yet, but there's lots of good ideas for apps and things that you'd kind of be able to plug into some information. When you go shopping, you just scan the barcode of something and it will tell you a lot about the chains that happened to get that bit of food to your plate so you can make those kinds of decisions. At the moment, a lot of those are really opaque, the bits of information, so it's hard to find out. There are greater movements about that, and I think you'll see a greater call from citizens wanting that kind of data, which might see people opening it up more. And especially as Kirsty was saying, businesses are acting differently. I think we will see that kind of growth in knowledge, I think, and there's an opportunity for people who want to be food data geeks already, and it's growing, so there is a...</p>
Kate Chapell	<p>Thank you, and final question in the room please?</p>
Question 6	<p>Thanks. There's been a lot of talk today about emission reduction for climate change in terms of renewable energy and stuff, but I'm kind of surprised it hasn't really mentioned anything about dairy or meat production. I heard a while back that it accounts for fourteen point five percent of all greenhouse gas emission, and that's more than all the transport in the world combined. So do you think that plays an as important role as renewable energies in terms of how we're going to move forward and tackle climate change in the future?</p>
Kirsty Lewis	<p>Well yes, as you say, it's a huge contributor to global emissions. My work is much more on the impacts, but the UK Food Security Programme is funding a lot of this work about food resilience, and part of that is about this wholesale structural change of our food system. So not just understanding the risk, but tackling waste is another big issue with emission and food security, and also how we're bringing cultural change to our diets. I talk about it quite neutrally, like I talk a lot about the soy bean, and the soy bean intensive production also being shipped around the world, and it's generally being used to feed livestock, and if that wasn't being used to feed livestock we could be eating that food that we're growing. So I suppose, in a sense, I'm kind of putting it out there that's the open question, you can see that yourself; how much is being grown and how much is moving around, and if that data's available, people can start making that information. It's difficult for me to comment on what you should do, but you can see that, you can see the percentage of the emissions that are contributing to climate change that's coming from meat production. You can see what it means for food security in terms of the amount of energy and production land that's going into growing that food. You can see that.</p>

Alice Bell	<p>Very quickly, traditionally a lot of the activists who try and do work to encourage people to take action on climate change have avoided that topic because they don't want to come over as hippies who don't eat meat, and they just think there's all sorts of cultural package that goes with that which will alienate audiences, and there's also a sense of we don't want to tell people to stop doing things. Let's have abundance, let's put a solar panel, don't just stop driving or eat meat. I don't think that's a productive approach to take. I can see why people do it, but I don't think it's a good idea. But one of the things that's good in the last few years, is we have seen organisations like Friends of the Earth running things like 'flexitarian' projects, where they're like 'hey, we're not telling you to give up meat, we're just saying just have a few meat-free days. This is what you can do to change your diet. You might find that you end up going completely meat-free' and sort of working in that sort of more liminal space to help people shift their dietary changes and be aware of that. And I'd like to see more, and the charity I work for focuses on energy because we're so small, but we may well run food projects in the future, and I'd like to see more people tackling that.</p>
Carlo Buontempo	<p>Let me try to close now on a funny note, so to speak. So I think two things have happened here; on one side the amount of meat that we consume has increased massively, if you look at the diet five hundred years ago and that is quite different for the general population. The second point is that we started to eat the wrong kind of meat, if you like, in the sense that eating cows and as Kirsty was mentioning these are fed using food that could be actually eaten by us directly, which would be more efficient from an energy point of view, while goat and sheep can live on the mountain [inaudible 42:44]. The other aspect is that cows actually fart. So there was a paper in the past that showed that if Australians were to eat kangaroos rather than cows, they would reduce their carbon footprint significantly because kangaroos have a different digestive system and they don't produce methane as a consequence of that, which is a very powerful greenhouse gas with respect to CO2. So clearly the footprint is a much bigger issue, but just to close on a funny note, I thought it was an interesting quote to make.</p>
Kate Chapell	<p>Thanks for that. I'd like to thank again our three speakers, Carlo, Kirsty, and Alice. And also to thank you all for those great questions and for an excellent afternoon session, it's been a fascinating couple of hours. So thank you all very much and thank you for your contributions.</p>
Outro	<p>We hope you enjoyed this panel discussion, and thanks for listening. You can hear the rest of the talks and discussions from 2016 at futureeverything.org/2016podcasts.</p>



[Transcription ends]