**INT: [unclear 0:00:00] So it’s just a sort of pop there for your consent.**

DEU32: Yes. Has- Has that worked?

**INT: Yes, that’s fine. Yes, as long you click continue that’s fine. Brilliant. So I think just sort of to start off with, maybe if you tell me a bit more about your backgrounds so, the organisation that you work for and then your role with that.**

DEU32: Yes. So, I’m [DEU32], the [FARMERS ORGANASITION] North East Senior Environmental Land Use Advisor. The [FARMERS ORGANASITION] North East Region covers, Yorkshire, County Durham and [county]. We have around- Sorry we represent circa 6000 farming business across that patch. Our region is part of seven regions covering England and Wales, from the [FARMERS ORGANASITION]’s regional team, national team, which is down in Stoneleigh. We have a London team and also still a Brussels team. So our role is to lobby on behalf our members who join the organisation. It’s a membership organisation. If they want to join us they pay a subscription and they join us. We cover all farming sectors from the top of the hill, to the sea, and even businesses who’ve diversified into the coastal aspect of it. We cover every sector. Some in partnership with others so, for example, pigs. We work very closely with the National Pig Association. But we cover every sector and as I say, we on average cover somewhere in the region of 2/3 of agricultural land in England and Wales. I’ve worked for the [FARMERS ORGANASITION] for over a decade now, coming up to 12 years. Prior to that about 9 years with [government department], doing policy work, policy translation. And certainly, within my field of work, biodiversity has been there throughout. Data use has been there throughout. But with strategic changes in agricultural policy, greater emphasis on payment for public goods, than changes within biodiversity net gain, local nature recover strategy et al. The focus has dramatically increased. As an organisation we’re very keen for decision makers to- To have access to the most up to date and accurate information. We appreciate it’s gonna be challenging and costly, but for us to ultimately deliver within the natural environment, we do need as much local data as possible. So that kinda-

**INT: Brilliant. Yes.**

DEU32: -bit of an overview.

**INT: No. That’s great. And that sort of leads me on to my first question. So, in terms of focusing on sort of species, records, data. Do you focus on single species, or groups of species?**

DEU32: I think from our point of view, one of the most important issues is that the farmed landscape delivers complimentary benefits for both agricultural production, but also biodiversity, or the natural environment. And- There’s- I suppose a bit of debate at the moment whether we should be calling it biodiversity or wild life. Do people actually understand what we mean by biodiversity, do they have more association with wildlife? And what we often find is, wildlife does hit those decisions- Decision makers more. Because they don’t have an understanding of the complexity of biodiversity, or even of agriculture. But certainly when it comes to the agricultural farmed landscape, we do unfortunately have a tendency to focus on, let’s say, the important, the interesting species, that are out there. And not necessarily data on general species. The ord- Maybe the perceived ordinary species. That maybe not in decline but are critical to a health ecosystem and a healthy bio diverse system. So, farmland hosts a range of these species and so it’s really useful and what we often try and do is make sure that we have an understanding of how these are all performing, within that landscape. I think if I can, the second one, and important point is, how data has changed. How the assessment of data and the parameters within the data can change patterns. And I think we’ve- We’ve for many years had a tendency to look at significant trends which maybe, certainly with the biodiversity lens on, were changes within the farmed landscape, or within the wider environment, that were happening between the 50s and 80s. And obviously within the data we’ve- We’ve seen certainly a lot of, lets say, plateauing, levelling out, maybe even some- Some improvements. However, that’s one of the critical aspects of modelling and biodiversity data which is a really important point for us to- To make sure that we get across as an organisation and we really like- Would like to see others capture within what they put. I think there’s been a [s/l sea 0:05:39] change in, lets say, funding. Whether that’s central government funding or society’s willingness to- To pay for charity work, or other such. But, for many decades the- The kind of- The process was demonstrate an issue, and we’ll fund it. Demonstrate a decline and we’ll fund it. And so the plateauing phase- If I was let’s say looking at the data for biodiversity and said look, “Dramatic decline in biodiversity between the 50s and 80s, levelling out since the 80s and maybe some improvements, because of all the fantastic works being done.” Would I put my hand in my pocket and pay the £10.00 or is as dramatic as- As the big decline. And I think it’s a case of we need to be presenting an actual and a better situ- A better realisation of this and the interaction of all of this as well. Some of these biodiversity changes are outside the scope of human activity. They’re within the scope of mother nature and she’s becoming even more challenging. And certainly within- Within modelling with the area I work, the importance of factoring climatic change or as many of our farmers would describe it, the real weather changes. The dramatic changes in the trends that we’re seeing there. So I think they’re certainly a couple of areas when whenever we’re presenting or trying to get people to present data on this, It’s the real world, what’s actually happening here and now, not just kind of legacy. What’s the reasoning behind the data? What are we driving to? Are we just cherry picking the big headline species? The big headline flora, fauna? Or are we taking the whole gamut of species that have really valuable places within our ecosystems but we don’t necessarily truly value and maybe if we did, wouldn’t give us as scary a picture as we’d maybe like to. Caveating all of that with the fact that funding within data and presenting that, or even the challenge that we have many times getting our family businesses historically to capture that data, and openly present that data, has been a challenge. And I think one area where we have really been challenged is around data use or data misuse and the confidence in presenting that data. I think many family businesses who signed up to enter into environmental improvement schemes were not clearly explained to them, about the information that they present within that. How that has been freely available, which is really good and really valuable but, how it’s then being used and interpreted and modelled. And maybe isn’t necessarily what, from the outset, they were wanting to present, or mismodelled sometimes, or modelled without parameters or with parameters. So, it’s always a challenge to- To get people to improve presenting the data, maybe within the new payments for public goods there will be a further requirement for presenting more data, but it’s making sure people are really clear from the outset. You are handing your data over. Who can use it and what’s- What’s the small print that the farmer really wants the person who is pulling the model to read? But it’s in the small print. And the small print and the example that I- I often use is for example, pollen/nectar mixes and species rich- Species rich swards and they’re presented and- And areas are covered and captured. But, they don’t always reflect what happens on a year to year basis. How that complements the wider farming business. And so someone would just say, “Our total area of a particular species is that.” And so you assume the rest of- The rest of the farming business is there. And that’s not the case. That’s what they are being paid for. The fact that they’ve got their own voluntary work, the work we’ve seen through Campaign for the Farmed Environment, a dramatic increase. Or just the general flora and fauna on the family business that they do and manage because it’s just the way that they operate. Those aren’t always captured.

**[0:10:38]**

**INT: Brilliant. I’ve got a few points, just to-**

DEU32: Please.

**INT: - sort of bring up, after what you’ve said. So going to the sort of miscommunication aspect between, is it farming businesses that you’re in exchange with. Is there anything that you’ve done to sort of mitigate that?**

DEU32: I think, for- For us when we are- So my role is to work with our family businesses and give them advice and guidance. But predominately the majority of my role is to engage with external organisations, charities, [unclear 0:11:16], companies and such like. And so, for us as an organisation, what we’ve done is, even undertook- Undertook survey work ourselves, of our family businesses. So we’ll proactively undertake surveys. Or we’ll get them to participate in other initiatives. For example Campaign for [unclear 0:11:41] the Big Bird Count, Farmer Bird Count, and these types of initiatives too, to- To fairly give a representation of what’s happening there. Because, for example, we’ve seen a marked increase in the numbers of people taking part in the Big Farmland Bird Count. Why? Because we did get the annual state of nature report which basically says, it’s a barren wasteland. It’s predominately because our family businesses either haven’t interacted with it. With these surveys or these data sets because a, they don’t have access to it. A lot of them don’t have broadband and such like. They’re incredibly busy. Their running a business, their running a family at the same time. They’re dealing with mother nature and they’re doing the accounts. Doing a survey, what’s the importance of that? But then- For us, our job is to explain the importance of these surveys and how this can change policy, that ultimately curtails or creates opportunities for their family businesses. So, for a lot of us it’s around explaining that. I think the other one is to break down some of the amalgamation of what we talk about biodiversity. So for example, pollinators. Pollinators are just pollinators under biodiversity. Rare species are kind of continuing to become rarer. Common species are becoming more common and obviously this creates this kind of debate around what we’re trying to protect. The rare stuff, usually very rare species obviously need certain habitats. Does that mean that the common species, the common stuff, we don’t need to maintain? And so, it’s about the- It’s about providing the ecology or pushing the- The information, the policy to more outcome based approaches. So we’ve done a lot of work, originally with- Regionally with the [Place] National Park and their outcome based projects. Because of the value and inherent knowledge and expertise our businesses have- Family members have as individuals because their farm that on a day to day- And they manage that. And when I say farm, and we talk about the farmed landscape. It’s not use farming for food production it’s farming for the place they live, for the family, for that general side of it. And I think we have done some work, which maybe kind of says, well look, look at the abundance of a particular species. Do we actually know what the abundance is of certain species, pollinators for example. Where we look at the- The kind of declining side of it. But are we seeing a change? And do we see- Specifically with butterflies. Specifics- We look at specific butterflies, but generally we’re seeing more of those? Is it- And is it due to solely agricultural practices? And I think that’s one of the final areas that we do spend a lot of our time talking about, is the competing the challenges that agriculture faces and the demand that society is putting on agriculture and how society’s decisions are actually changing the landscape greater than agricultural practices. So, for example, we’ve seen declines in certain species because of their nesting habitat. The habitat’s there, why aren’t they nesting? It’s because they’ve been disturbed, because everyone wants to go and see that particular species, of whatever. We see designated areas for a target orchid. And what do we see, hundreds and thousands of people going to see the orchid. And so they potentially destroy- They go and clump around this orchid- This is a conversation many of our farmers have.

**INT: [laughter]**

DEU32: They are like. You don’t tell people about it. They- They sometimes have feared the survey work because, it gets out there and- And suddenly that little isolated place where this- In the valley side where this particular species- Suddenly there’s thousands of people. Well not thousands, but hundreds of people, looking at this particular orchid. What that species wants to do is to expand. And we actually want it to expand. If you’re creating a ring fence around it or, I think the other challenge that we often see is, is we’ve got loads of people with lots of expertise and lots of knowledge, which is great. Trying- But they’re to implement their- Their interpretation and their understanding of a particular species. On that location and the farmer- The farmer will say, “No, no, no, you don’t wanna do that, because this’ll happen.” And they go, “No, no, no, I’m the expert.” And the farmer gets overruled. So this understanding of what the data is used for and making sure within the data- And it’s what we’re doing in local nature recovery strategies in the pilots. So we’ve got the [county] pilot. I think being quite candid. We’ve seen some of the other local nature recovery strategies where the original group, who’ve pulled that together, have really, actively involved colleagues of ours within the organisation. The [county] one took a slightly different approach and probably a more traditional approach, which was to get the key stakeholders together, the specialists, Natural England, Environment Agency, The Wildlife Trusts, the National Park, biodiversity specialists. Pulled them all together, pull all the data together and then present that to the industry. And fortunately we’ve been given an extension on that. But I think the critical thing is to ground proof it. Because a lot of our family businesses see biodiversity, but as an important intrinsic part of their existing business, but an important part in the future of their business?

**INT: Would you- Is there- Does there need to be a sort of incentive on their side?**

DEU32: I think so. I think- I think the first thing when it comes to this is, governments or society’s decision now is that farmers are no longer to be rewarded through the mechanisms that we’ve had in the past. So we know that by 2027 family businesses in Yorkshire will have lost 50 per cent on average of their farm business income. In the North East in the- In what we call True North East, 80 per cent. 80 per cent of their farm business income will be gone in 2027. By 2024, that’s half of that, so 25 per cent, 40 per cent respectively. And, so, their gonna have to make an income from alternatives. Now, critically it’s about saying does data have a value? Does presenting data? Does [unclear 0:18:36] importance of that. Then potentially there’s- There’s a value in selling that data. And there’s the big debate about that. The second one is, if by presenting the data and there isn’t a reward for the data, does it therefore ultimately mean the farming business or the land manager who will be the ultimate custodian of that biodiversity, potentially. Whether It’s a farmer or private company, or an environmental group, they’re all the same, they’re the land manager, or water manager should say. Land and water manager. They’re the ones that’ll manage it. And I think that- That the first big critical point there is, if by presenting the data for freely, it allows that individual to benefit financially. Then I think there’s understanding, yes. But if- If that basically just puts money into another organisation then dictates, there’s a reluctance for that. Which you can understand. I think that- That the other important point is the accuracy of it. As I say, habitat and data spe- And species data, it comes from data centres that have- Have- Of a variety of different levels and if I can I’ll draw you an analogy to what agriculture and land managers are facing with the climate emergency. So, lets park the biodiversity emergency at the moment and just focus on the climate emergency. We’re trying to avoid some of the pit falls that society’s leaders are making at the moment. The primary one was, many of the local authorities with limited budges were declaring climate emergencies. They were presenting a climate emergency based upon a particular, lets say, trajectory. Now some early adopters of these climate emergencies to get a baseline in the data were basically using for example, Leeds Climate Commission, Leeds Local Authorities data sets, their models. And then suddenly as the government realised this is really kicking off. They commissioned [Sustainability Consultancy] to produce the scatter models. So Bayers paid for [Sustainability Consultancy] to produce the scatter model. So this is a model which takes national data on each local authority, generic national data, inputs it into the model and then when the local authority officer or counsellor goes on to that data base and pulls it off, the data’s- They don’t need to mine the data, the data’s- The data is already there. But it’s only the national data and the generic data. So the national data is already there. It then produce- Modelled and produces the outputs. And we from the agricultural and land management sector have seen a mass trajectory of organisations and companies and councils saying, “Plant more trees, reduce meat and dairy consumption.” We overlay that with what the Citizens Commission on Climate looked at, and they were talking about a fair and just transition. They were talking about people’s individual choice on what they wanted to eat. Whether they wanted that choice. That didn’t match what local authorities and others were saying. So when we worked with [Sustainability Consultancy] with the- And this is how as an organisation we work. We actually work- We approached [Sustainability Consultancy] and we got them to explain the model. And it was at that point that we realised that for many local authorities who didn’t take the next step, which is what [Sustainability Consultancy] as a- A modelling- Model said. This is the basic, before you implement a policy decision, you need to use your own data, in- Put more data in, add the costs, and many of them didn’t. We looked at what the outputs were for land management. So for many other decisions, it was electrifications of vehicles, reducing traffic and all the rest of it. For land management and agriculture unfortunately there were only two outputs. Plant trees, reduce meat and dairy. So now we have a clearer understanding why there’s that political pressure and the particular push from lots of organisations on doing those initiatives. Now, we’ve now then worked with Local Authorities to say, look there’s a bigger picture here and you need to be using more data and we’re really keen to make sure we avoid those pitfalls from the biodiversity emergency. We don’t just have a standard model that every local authority uses because of financial constraints and even more financial constraints [unclear 0:23:23] moving forward. That they just used the- The very high level and then they tried to implement that in the farmed landscape and they go, “Why isn’t the farmer adopting this? This isn’t happening.” And then the next reaction is, we’ll regulate it or we’ll use this power, we’ll use a compulsory purchase power or we’ll use a- A, not a section 106 or we’ll use a- A [s/l sil charge 0:23:47] or whatever. So we’ll use other powers we have to implement it, because they didn’t want to do it. Well why? Because it didn’t marry the system.

**[0:23:54]**

**INT: Yes.**

DEU32: And I think the other important lesson that we learnt from the climate emergency is an understanding is an understanding of time and timescale. And that’s- The one thing I keep talking to so many organisations and so many individuals about is time. First of all it’s a double-edged sword for agriculture. First of all agriculture is going through this massive change. Within the next six years they will be losing half to 80 per cent of their farm business income. They need alternatives quickly. They’ll have lost 25 to 40 per cent, depending on- [unclear 0:24:31] of their income by 2024. And payments for public goods, [s/l Elms 0:24:36], [s/l SFI 0:24:36] and all the rest of it isn’t going to be commercially available for them all until 2024/25 so they’re going to be wanting to make decisions now. Potentially, biodiversity net gain is a great opportunity to sell that. But you’ve got to get the right understanding of the- What’s happening on the ground. The second point is, we’re dealing with a natural environment so, it needs time, it needs to take the time. But we also need to understand how the data flows. Now biodiversity doesn’t necessarily have- Or doesn’t have the perversity, but it might. There may be something that crops up. But there’s a perversity in timescales for climate that we’ve seen. So the- The trajectory at the moment is many organisations, councils, companies, will not financially be able to, or they won’t be financially able to compel their citizens to change with- By 2020- 2030, 2040, 2050. So then we won’t be able to electrify the car industry by that timescale. Society won’t be able to afford- They bought a car last week. I’m not going to go and buy another car in the next few years. So that will take time. But eventually society will catch- Hopefully catch up and we’ll see the big scary produc- Emissions start to plateau and then drop. The challenge we have- And we hope the rest of the globe does the same. The challenge we have from an agricultural point of view is, at the moment because of that lag there’s a push on mitigation. So there’s a massive push to change land use. If we change land use and we basically plant huge areas of carbon sink, whatever it is, and there not compatible with food production, there not complimentary with food production or water management or biodiversity management. We create huge sinks and then- And that’s in the- They’re commercial markets. But as we see the market for carbon plateau and drop. How sustainable are those huge sinks? And potentially I need £100 a hectare to keep my carbon sink going. And at the moment it’s going- It’s rising because there’s a- A demand. But as it plateaus and sinks, it drops from £150, £200 a hectare to £50 a hectare. It’s no longer sustainable for me to do that and I’m locked because of EIA regs or other regulations in that land change. And society by 2040, 2050 has a water emergency and by 2060, 2070 it has a food emergency. Are we going to kind of see that- And that’s the nervousness that farming has and land management has, is this continued trajectory, and it’s why it’s really valuable to look at how society changed with the biodiversity challenges and- Of the 50s and 80s. And what changes have improved between the 80s and now.

**INT: So essentially, you’re trying- You’re looking at the past, but also thinking towards the future in terms of how you implement your strategies?**

DEU32: Absolutely. Trying to align them. And I think the challenge with the strategies are a lot of them are fine for 10 year strategies, price reviews for companies and such like. Or they’re political, local authority elections, national government elections. And these decisions will change. Land and the environment doesn’t. It doesn’t like that. It doesn’t have that flexibility or, you can’t just swap from one to another. And we’ve seen the historical aspect of that. We saw a post war draining of the upland peat for the food production and now we’re berated for doing that. And we forgot about that post war aspect of it. And that’s great, but society- It takes the time to deliver that. And then the other one when it comes to kind of the- The biodiversity. It’s about having the right biodiversity in the right place, for the right reason. And yes, certain biodiversity is complimentary with some of the climate emergency. So, lets take- I’m going to create some biodiversity- Biodiversity net gain to offset climate change. And I go and plant an area of new ponds and species rich habitat. Fantastic. There’s 10 hectares of it there. And if 5 years time, it’s 6 meters under water. Why? Well because of a big flood event and they build a housing estate somewhere else and the biodiversity policy didn’t marry up with the flood risk policy. And we need land to manage flood risk. We need land to address the climate emergency. We need land to address the biodiversity climate, food production, water management. All of these all happening with different policies, different government. And that’s where the data’s so critical. So whilst we may look within the biodiversity lens of data, modelling biodiversity of data- Modelling biodiversity data, it’s having an eye within that model or modelling work about what other policies, or other drivers are for the sector or the industry or society at the other end.

**[0:30:03]**

**INT: Yes. Just quickly because- I mean what you’re talking about is very interesting and I’m conscious about time. But, you talk about the sort of strategies and how they’re likely to change, their long term. But I think the difficulty is that doesn’t mirror up with what you were talking about, sort of, giving nature time.**

DEU32: Yes absolutely. It’s about we’ve got the 25 year environment plan. Fantastic, it’s a joined up policy area. But 25 years? We’re talking decades for many of this. I think one of the other final critical areas which we really need to do is, there’s a- It’s- There is- I see on a daily basis there’s a huge amount of data and valuable information out there. But the biggest challenge that we have is, if I’m presenting that data to get a water company to change what it does. I’m presenting that to a handful of water companies in England. If I’m presenting that to agriculture and land managers, there’s tens of thousands of individual businesses I have to present that to. And it’s hard, it’s difficult, it’s costly, it’s challenging. And I think one of the biggest challenges that we have when it comes to biodiversity data is how can we communicate that data back to land managers in a clear pattern on a robust evidence base. That allows them, empowers them to make an informed decision. Because ultimately where we are seeing great change is where you’ve empowered society, a business or a sector. With information that they can build into their knowledge and expertise, to deliver the change.

**INT: Yes. And so in terms of sort of communicating this to your landowners, is this where you see model data, sort of, coming in?**

DEU32: Absolutely. Absolutely. I think it’s about presenting the data in a variety of fauna- Fauna!- In a variety of different formats. So for some they want an advisor to do that for them. For some- A lot of them are now using interactive maps and mapping data, so they can overlay all of this, so they can- They can- For example the magic map system. And they’ll overlay the magic map data with local authority data and they’ll- Some have the skills to do that. Some need advice as to help them do that. But to physically see that for their farmed business geographical boundary is critical. We talk- nature doesn’t have a boundary, but whenever we traditionally present data, we present it at a- A catchment or Local Authority level. The classic one, with a base of management plan data, Catchment Data Explorer presents data on a catchment level. We’ve asked time and time again for them to present a Google Map so that a farmer can literally see an ariel photograph of his farm, top field, bottom field, the farm. And overlay that, the rivers, and the water courses and colour code them to what they are. So he can physically see he’s got half his farm green, sorry blue, because it’s wonderful. That’s water course is fine. Half of it’s amber. And he- And then he can click on it and go, “It’s failing for phosphate. What am I doing differently on that part of the farm, to this part of the farm?” He can then make a decision visually and go, “I need to change what I’m doing here first of all. Do I overlay the two”? And he might want to try that. Or he can go, “I don’t know what it is? I’m doing the same. Something’s different between these two areas. I’ll go and get an advisor to help me.” But it’s empowering them to do that. So some like to do it visually, some of them might want somebody else to help them with that. So I think the- When it comes to modelling, if it’s about critically allowing empowering them, so you create the model but you allow them to put in their own parameters. So they can- So your model may say, your soil type for your local area is chalk, silty loam. Well half the farm is silty loam but there’s no glacier and half the farm is clay. I wanna put- Have the ability to change that myself. Within the model and adapt the model myself. And I think the final one is making sure when we’re comparing two- Two aspects, that we compare the same. So the base and the modelled data are the same. We don’t- We don’t model, lets say biodiversity in the 1950s and 80s and then overlay what we want society to do, based upon that. We need to do that about where we are now. We kind of go- Go this is how bad it is, because that’s how bad it was. We wanna know the- The real data.

**INT: Yes. So, yes, quickly, I think the important issue is sort of real time data.**

DEU32: Yes. And get them to understand by them maybe going out and getting a- A- RSPB to come and do a bird survey on their farm. They can then input that data themselves and see, “Oh actually yes, this creates an opportunity for me.” So- So we can use the generic date for the area. But if they really wanna go into that area- It- It adds the value to it. It- Paying a couple of hundred quid for RSPB to come out and do a survey, allows you to access the scheme or can create an opportunity.

**INT: Yes. Brilliant. So model data- I mean you talk about how it would inform their decision. Does it affect your decisions as well?**

DEU32: It does. I mean, for us, as an organisation, we always push for- For information to be evidenced based. And it’s the old adage, a model is only as good as the data you input. So I think it’s about first of all understanding the parameters that this operates within, clearly at the outset, and what potentially the limitations are of it. And being really crystal clear within the model. The limitations of this model take you to x. So that if someone else then takes your model and stacks it with their model. They understand that there is a- There’s a difference between the two. But for us. Yes. I think if- If- If these types of modelled outputs will lead into delivery for local nature recovery strategies, potentially enhance decisions that our businesses will be making, create opportunities, allow them to make an informed- More of an informed decision. Then- Then we will be very happy to kind of be promoting those. I mean for example we’ve got the old challenges with- With managing manures and fertilisers and such like. So we- We’re constantly promoting the latest information. We’re promoting examples such as tried and tested. But that gives them the flexibility within the model to input their own information and as- As the more advanced with the latest digital access can do that, it’s also understanding that you’ve got parts of the region where like [county] National Park, 10 per cent of the National Park does not have mains electricity. So there’s not even broadband. We’re not bothered about broadband, we just want mains electricity. So it’s understanding that the natural environment that our members work with in a day to day basis also has challenges. And having a model, a big, flashy, shiny model, if I’m on, the majority of them copper cable. There is broadband to the local village, but I’m on copper cable and even downloading an email or sending an email can take a couple of hours. Can- Do they actually have access to the model and they need to. They need to have accessibility. So is it a model that can be freely available in locations where they would be going naturally? So farming businesses in remote upland areas, on a regular basis go to livestock markets. Is there going to be access to these important outputs and help them make a decision or do they just wait for the land agent to come up with his shiny computer, and he can do that offline. So it’s not just an online, it’s an offline version.

**INT: You talk. Sorry. You talk about the limitations in the model. Is that- Is that talking about sort of errors that exist and then you can follow it up with like a development or refine the model? Is that-**

DEU32: I think so. I think it’s about first of all outlining the limitations and maybe understanding that there are parameters in here that if you’ve got better knowledge and information or local information, put the figure in yourself. Or, if you use the model version 1. There may be a version 2 and 3 in a couple of years time or couple of months time. So it’s understanding that as well. It’s also understanding the variability. For many of our family businesses, they’ve liked traditional ELS, HLS agreements because you do a, b and c and you get paid. There’s a nervousness to- To move 100 per cent to them being in control. Because if something goes wrong their at risk. But there’s a transition and a flexibility within that. So it’s saying, “Look the model, models the opportunity for creation of habitat in this area.” What it doesn’t say is, that complements the farm- Farmed landscape decision that the farmer has made. He might be the only farmer in the area that- Or the family business in the area that produces the majority of England’s carrots, or whatever. He’s gonna struggle to- To marry what society’s modelled onto him, against the contract he has with ASDA or somebody. So, it’s understanding the commercial aspect of this. We have- We have to get our 100 per cent of our income from the marketplace. So it has to complement that.

**[0:40:36]**

**INT: Yes. Of course. Absolutely. I’m just gonna sort of retract a bit. Just to sort of, your data- Current data use, before I show you some examples of model data. So you talk about sort of local record centres. Do you obtain your data from anywhere else at all? And is it raw data or as a product?**

DEU32: I think predominantly for us we use products. Because of the skill sets and also the resources that we have. And a very challenging- We don’t have the skill set, we don’t have the- We’ve got colleagues- We rely extensively upon colleagues who have great data sets, economic- We’ve got an economist team nationally, we’ve got teams that help us with the GIS work and such like. But I think what we are increasingly finding is, data, modelled data and outputs that are in mapped format, GIS format, but are freely available on the GIS platforms are incredibly powerful and those are increasingly becoming more and more valuable. So that if a farm business has got it’s own system they can overlay this as a layer. But I know certainly we haven’t traditionally as an organisation done a significant amount of research as well ourselves. But we have in the last couple of decades actually commissioned scientists to undertake research and done modelling work as well. So we’re very much catching up but, we’re balancing kind of, the core, which is advice and guidance or, the advice and guidance is to and seek advice and guidance from somebody else, a specialist. Or work with that specialist to come and deliver that- That advice. So potentially one of the things we could do, or may need to be doing, as part of local nature recovery strategies, once as there being developed, is to get the teams that are coming out and developing these strategies and the modelled information within there. To come and present them to our family businesses. What we often do with flood schemes and other initiatives, is we get those competent bodies to come- Come out and engage. We’ve seen some real valuable benefits of when they’ve been developing flood models and coming out and running the raw data and going, “This is what the model says.” And the farmers go round and go, “Well, yes, but in 1852 when the so and so happened the water went that way.” And they go, “The model say it does that.” “Well it does because there’s an old ditch in there that’s a glacial cut,” or whatever, or a mine head, a bore hole. You name it, it’s on agricultural land. And they then go, “Perfect.” So your model may say, this is the right area for this particular species. “It’ll never grow there!” “Why?” “Cause there’s an old lead mine. It’s got lead pollution. What does grow there is this species which is an even rarer species!” But it’s not modelled. So that’s how we would operate. We would get that opportunity to present that model output.

**INT: Yes. Brilliant. And just sort of finally in terms of your interpretation of the data. How do you deal with data gaps?**

DEU32: Honesty. Honesty from the outset. I think ultimately is in any thing that we as an organisation are trying to present to our members is we present them with either advice, guidance, information to get them to make an informed decision. We’re not telling them, “You must do this.” That’s not the way we work as an organisation. We would never tell a business that, “You’ve got to do this.” We give them and present the information. But critically as part of that, to build the relationship we as an organisation have and- And have been able to sustain with our family businesses is we’ll say, “Look, this is the model data. But there’s a major gap in it. There’s a major gap because we don’t have this data layer.” Or, “If we use that data layer it will throw up an inaccuracy.” It’s still a really valuable piece of information to allow you to add that into your decision making. Allows you to add that in. In some cases some of our family business will go, “All right, well if there’s a data gap there. I’ll pay someone to go and fill that gap.” So we have some big- We’ve certainly got some big family businesses in our area, big landlords, big estates, big areas- “Yeah, we’ll just get a consultancy come in to fill that.” Because they- Certainly historically they’ve had a larger land mass and the flexibility to do that. Financial flexibility to do that. I think as we move forward into a landscape where there’s going to be an even more financial marketplace for biodiversity and an even greater marketplace for biodiversity and other public goods. As long as the price is right then, if the price is right, as we talked about the carbon point of view. It cost me £100 a ton. Why’s it cost me £100 a ton? Because every year I’m paying a fiver to [Name] to some modelling. Because there’s a model- There’s a gap. If- If my price is £200- If I’m getting £200 a ton, I’ll pay [Name] to do an extra piece of research. But if you’re only going to pay me £50, I’m sorry [Name} I can’t do that, the evidence is not worth it. And that’s the commercial decisions.

**INT: Yes. Of course. No. Absolutely. And that’s gotta be taken into consideration, hasn’t it? Just finally before I sort of focus the last 10 minutes on the model data examples. So how would you consider accuracy and completeness of the data?**

DEU32: I’d use the analogy that I’ve always kind of learned from my previous experience. I- We’ve- On my previous job, it’s a lot of work with economists, environment and agricultural economists. Absolutely, they’re the experts in the field. And there has to be a trust relationship with them. That they’re doing the right thing. But there also has to be this- This kind of this feeling- This kind of intuition that something just doesn’t look right. So, I’ll give you an analogy. So they’d got a model that was looking at a particular output and let’s say the output they were anticipating for the model was- You’d expect for a farmer to practically make a decision from moving from that crop to that crop, indicatively you’d be expecting a cost for them to do that. And there wasn’t. It was coming up as a benefit. And it- It wasn’t happening. And so, we- I asked them, “Look, what parameters are you using?” “Oh, we’re using x, y, z.” And one of the parameters- And it wasn’t as simple as this. But they were basically using a rotation. Now as part of a model they have to use scientific, peer reviewed papers. And the only paper they could find wasn’t the Norfolk four-course rotation. But it was a really old rotation that was a peer review paper. So what we did, is we got the economists to go to a different team in Defra who were doing pesticide surveys, and actually collecting this data. Get the pesticide team to produce a paper on that. Fantastic, get another scientific paper. And they were using a more up to date model. So that was a really good lesson and I’ve used that throughout. So we’ve had another model that looked at wetland creation and what the benefit of having wetland on agricultural land is. So having like warping land. Absolutely fine. Now the model came back as really positive economically. Flooding a field with silty water’s fantastic and you’re kind of looking at it going, “Well, I expected it to break even if not cost a little bit”. Because once you’ve flooded it, you’ve got to drain it, you’ve got to bring the land back into production, there’s lots of cultivation costs-

**INT: Of course. Yes.**

DEU32: -how’ve you managed to get such a fantastic positive. And the assumption was that, once you’ve flooded it, because of the silt, because some papers in America said it brings nutrients with it. The assumption was, no fertilisers required. Or 100 per cent of the crop requirement for the next 10 years are supplied by this one year of warped material. So instantly you’re like, “Well maybe go for one year or two years if you’re lucky.” And when you put that in the model it seems to balance out. So it’s about intuition and reality.

**INT: Yes. That’s great. Have you got time to sort of just look at some-**

DEU32: Yes.

**INT: -yes. Brilliant. That’s great. So I’m just gonna share some examples of the models that part of the team have created and I’ll just ask if you can interpret them and then whether you’d find them useful?**

DEU32: Now you’re gonna challenge me!

**INT: No, you should be all right by the sounds of it. So I don’t know if you can see that yet.**

**[0:50:01]**

DEU32: Yes.

**INT: Yes. Brilliant. So these are model data outputs for the Fivespot Burnet Moth. And obviously they can be done for a variety of species. But this is the one I’ve got. So the one on the left, I don’t know if you can see my mouse here?**

DEU32: Yes. Yes.

**INT: But that’s a raw probability distribution.**

DEU32: Yes.

**INT: Are you able to interpret that?**

DEU32: So basically you’re- You’re indicating that that particular species is heavily distributed to the- To Wales and the South West.

**INT: Yes. Absolutely. Yes. Brilliant.**

DEU32: I instantly wanna know, well, what’s the date- Where’s that data come from and what year has it come from? And-

**INT: Yes. Of course. Well I can provide you a bit more background and-**

DEU32: Well. No. No. So go on then.

**INT: Yes. So in terms- It doesn’t tell me, sort of the age of the records, but they are from the NBN Atlas.**

DEU32: Yes.

**INT: And in terms of the model itself, on the left. So it uses 21 land cover variables and 19 climatic variables, along with an understanding of the conditions in which a particular species is found, and the available literature. Most of the variables use a scale of 100 meters.**

DEU32: Yes. Well that’s pretty good for- For grid parameters. Yes. I think ultimately- So that’s the model data. Run that by a farmer, who lives in, I don’t know, the [Place] and has that particular species all up his dale. And it’s about- If- If that was overlayed- So basically I want to enter into a scheme because that particular species is the priority species and not a natural species, and I’m gonna get paid for it. It basically means if you’re in Wales and the South East- South East/West you’re gonna get some funding for it. But our guy in the [Place] who has them all up the valley. He can’t get any cash. So that’s about the importance of model data.

**INT: Yes. Brilliant. And so just focusing on a slightly localised scale now. Again, a same concept of raw probability distribution. At around a 5km point in Wallingford. Which is in Oxfordshire. Does- Is that easy to interpret as well?**

DEU32: Yes. I think obviously gives a distribution, but I think it’s also important to understand some of the parameters within why there are particular hot spots in areas. I mean I can- I could probably understand some of those low probabilities could be down to those areas being urban areas. Again, 5km data sets, I appreciate depends on your data layer, does vary, but if that’s all you’ve got, it’s a useful grounding. And I think for a decision maker or for someone going to make a commercial decision. The bigger the- The higher the resolution. The more weighting, more propensity you’ll put against it. The- The more you [unclear 0:53:18] the 5km. Well that’s, it’s useful, but lets see how it comes out.

**INT: Yes. So are you talking about, as well, the sort of contextual information to go alongside?**

DEU32: Yes. So I think it’s a case for that particular- So let’s take it- There’s a particular reason why the species are- Of that particular species are heavily focused at that scale to the right [unclear 0:53:48] you could call it. To the South East of the area. There are particular reasons why certain areas aren’t. Is there other external or climatic factors that are impeding that? And is there- And should that prevent or inherent? I mean I’m just geographically looking at it and presuming there’s either a railway line or a road going through there.

**INT: Yes of course. But, yes, it’s hard to tell.**

DEU32: You can’t tell. You can’t- You can’t tell the aspects of it. So this is why often we find it’s quite useful to overlay this even over OS maps.

**INT: Yes. Absolutely. That’s brilliant. So now just focusing on the variation model now. Quickly, so again for the same species. Are you able to interpret this model at all?**

DEU32: So clearly, you’ve got the different parameters in there. I think the first thing I would say is you’ve changed your scale.

**INT: Yes.**

DEU32: So I- If you’re wanting me to compare left with right. I’d be wanting the same scale.

**INT: Course. Yes.**

DEU32: And- The next important question is, I presume you’re gonna be using- Some other parameter has changed within there? There’s- You’ve introduced a fact that’s resulted in a complete change in that. What is that factor?

**INT: Yes.**

DEU32: It’s geographical or whatever?

**INT: Yes. So essentially, the variation model sort of works alongside the raw probability. It’s an attempt to try and show the areas in which you have-**

DEU32: [unclear 0:55:27]

**INT: - a greater or less confidence in that species distribution.**

DEU32: So you’re basically saying- These are your variabilities. So that basically what you’re saying is, is on the left you’ve got, this is where we think, but because there’s risk in- There’s areas within there there’s greater risk in what the model on the left is saying. And these are the areas where- I think if visually, if I was looking at it, I’d want it on a different colour scale system, so, you know-

**INT: Yes. Of course. Yes. We’ve had that.**

DEU32: -you basically have a red, amber, green system. And you basically say, right if I’ve- If I’m looking at the distribution on the left and I don’t know, lets take the- The Welsh belt, up the middle of Wales. Let’s say that’s got greater variability and therefore uncertainty. I’d want a big red line round that. And presuming it’s using the same scales and such like, but.

**INT: Yes. Yes. Same scales.**

DEU32: Comparing it, like with like, and what is the- What is it that’s changed and does it? And why has it changed?

**INT: Yes. Absolutely. Did you want a bit of background information on the-**

DEU32: Go on.

**INT: -yes.**

DEU32: I’m interested though.

**INT: So this is calculated using a sample of the background data to give a range in the projected probability. So this variation model was run ten times on ten different data samples. Which includes some points where there are target species records, and some where there are records for other Lepidoptera species, but not the target species. So points where the target species was not found are used effectively as absence data.**

DEU32: Um. I’m just looking at it and I’m wondering why, if your looking at lets say, the darker the colour spots, versus the one of the left, you’ve got a greater propensity to something happening in the Welsh, Scottish and then almost the high- The Pennines. I think you’ve got another- Something else happening in, well, almost the Fens. Something- As I say your drawn to these areas where- And It’s tryna understand what is the climatic or geographic or topographical aspects, that’s causing that factor, and clearly you’ve just said there the assumption is not present, therefore- In one survey, therefore not present. And I think that for a species that’s heavily rely- Heavily climatically challenged. You can have a really poor winter or a loss of a particular species in one- A loss of a particular part in their life cycle in one year and you lose it. Barn Owls, the classic one. So it’s about understanding that. And it’s a snapshot.

**INT: Brilliant. So I’m conscious about time. Was there anything that you wanted to- Else you wanted to talk about these at all?**

DEU32: So. No I’m really interested to see how the- How the outputs of this conversation and your research is going to kind of, feed into kind of some next steps. Because I think it’s- It’s a really valuable area, to make sure that, as I say, whether it’s local nature recovery strategies, biodiversity net gain, outputs, future nature based solutions and all of this, will heavily- And trust me, has heavily relied on data and model data. It’s how that’s going to- How your work’s going to help contribute and meet some of these challenges.

**INT: Yes. Absolutely. So these models are obviously sort of starting points. People like yourself. It’s about determining what’s important, you know, going forward, particularly with all the- You know the change that’s happening.**

DEU32: Yes. But-

**INT: And they’re looking to hopefully feed that in. Yes.**

DEU32: -but looking at these. These particular species. I’d imagine this particular species is a- A rare species. It’s not-

**INT: No. Yes. Of course.**

DEU32: -it’s not the common species.

**INT: I think, yes. I know, absolutely. So I’ve notices throughout all these discussions that there is a particular- Or a heavily emphasis on sort of priority protected species, and how these are vital to sort of the work that people are doing.**

**[1:00:02]**

DEU32: Yes.

**INT: And was- And that is certainly something that’s going to feed into sort of our research and into the sort of the application side as well.**

DEU32: And it’s fine. It- Absolutely look at the rare species. But if you’re looking at the natural environment, Colin the caterpillar’s probably as important as this particular species. Depends whether it’s Marks and Spencer’s, or whoever. But this is it, I think it’s a case of for general day to day aspects of it. It’s a case of that particular species, in that particular location, is as valuable to the natural environment and biodiversity. And then maybe other parts of different things that are challenging. And I think one of the interesting ones is we often talk about restoration and recreation. It’s interesting how some of the conversations are now acknowledging that due to climate change and such like. We’ll never be able to actually deliver that, no matter how much money and effort, and time and resource we put on that. So should be embrace the change in climate for now and actually focus on ensuring we retain what we’ve already got? Because ultimately are we going to lose those common species, because we focus on a priority species? And I think from- My final point from an agricultural point of view and a final point of view. Local people, general society, value the common robin. Probably not as common as it was, but. The common robin as much as they value the lapwing, but we spent billions on lapwings. Are we- How do we- Why should we make one over another? [unclear 1:01:51]

**INT: Yes. I think yes. I think-**

DEU32: Unattractive.

**INT: I think the issue, obviously, in an ideal world, you’ll wanna put all your attention across the whole board.**

DEU32: Limited cash and priorities. Yes. Well all I would say is, and it’s back to the caveat of the post war era. Society chose to focus on the priorities. So if in 50 years time when I’m retired, hopefully still around, maybe gone and buried, and your still- You’re coming to the end of your career. I do hope that in those years the fact we focused on the lapwing and we’ve lost the robin, doesn’t mean that we get berated for losing the robin. So, you know. Very good.

**INT: That’s brilliant. I’ll just stop showing my screen now. And just to sort of finally wrap up. Was there anything else that you wanted to talk about at all?**

DEU32: No. I think as I say from my point, we’ve covered- I’ve certainly said a lot.

**INT: No. It’s been- It’s been very interesting. And very insightful into what’s important to you. So, no, that’s brilliant. In terms of, sort of, just to wrap up, in terms of the next stage. We will be working with people like yourself to sort of codesign these outputs. Is this something that you’d be interested in at all?**

DEU32: Yes. Yes. Absolutely. Absolutely, please. Please.

**INT: That’s great. Well if there wasn’t anything else. Thank you very much [DEU32].**

DEU32: Thank you.

**INT: It’s been pleasure speaking to you.**

DEU32: Thank you.

**INT: And yes. Have a good day.**

DEU32: You too, take care.

**INT: Take care. Bye.**

DEU32: Bye, bye.

**Audio ends: [1:03:23]**