

Participant O Transcript, Interview 16th February 2018

Int: How many years have you been farming for?

O: I've been at [REDACTED] 24 years working with irrigation and irrigated crops, and before that I was probably just under 4 years I had straight out of college where I'd have been working on fairly typical [REDACTED] heavy-ish clay farm, 1500 acres, all combineable-crop. So before that at college, and I'm a first generation farmer, so no real experience before college.

Int: And the total farm size here is?

O: Within the boundaries of the estate we are farming just under [REDACTED] [REDACTED] cropped area. I also have responsibility for [REDACTED] and about another further 400 Ha that we farm on single year land rent deals from [REDACTED] growing onions.

Int: So you rent in some land?

O: Yeah so we rent in land on 5 or 6 different locations and the radius of that is three to 45 miles from here, but we manage it from here and then do various different things depending on how far away it is.

Int: I was reading the history of [REDACTED] online and it said that in the fifties the estate stopped growing potatoes and carrots at some point and I was just wondering what changed?

O: I'm not aware of us stopping root crops. There was a... it was the early 1900s, 1920's onwards it was very livestock focused, so it was very dairy and beef focussed, with sheep and pigs. Then that runs up until the late 1970s early 1980s. Cows disappeared and the farm then became very sugar beet and combinable crop focussed, and that would have seen the introduction of, in the early 90's, the introduction of irrigation around the estate, and probably the first potato, carrot and parsnip crops coming onto the estate. But on a fairly small scale. And then in 1997 the farm was completely realligned, there was a big investment in underground irrigation, reservoirs, root veg storage, and we massively expanded and effectively created a vegetable business within the farm. So we just sort of built it on from there really.

Int: What precipitated that change?

O: It was new management at the highest level, so the estate was historically run as three geographic farms around the villages that make the estate up. They were... I started in 1994 and at that time everything was in triplicate so there were three managers, three foremen and three workshop, three of everything, or 9 of everything, it was just all multiplied up. And it wasn't really utilising the water resource very much. So with a new agent effectively/ CEO/ MD of the business came in 1996ish, it was really pull it all apart and put back together as a sort of forward-looking agribusiness, and we've continued to refine that definition as we've gone along.

Int: Has the tendency to rent in more land outside of the estate come from developing the vegetable side of things.

O: Correct, yeah, so we built the vegetable side of the business up and we hit a glass ceiling rotationally in terms of the size of our footprint, so we couldn't intensify it any more and stick within what we think is a sound sustainable rotation. So four years ago we made a positive decision to develop the agribusiness further and start going outside of our own footprint, which was a new activity for us. So we've now been doing the single year land rents, and this will be our fifth year, from a very small start, you know, we probably had about 80 Ha and we're now up to 400. The FBT in [REDACTED], we've been in that 17 months now, and the idea of that was to be farming slightly different soil types, so we can look at slightly different crops up there, so we are growing sugar beet up there, but also, the important driver was to be able to grow packing potatoes for long term storage for our own marketing company, erm. Whereas off the sand we can do salad potatoes very well, processing, off the field pre-pack, but we can't do long storage pre-pack, so we needed a different soil type, so it's all about continued growth, continued expansion of opportunity, because with the two, with the [REDACTED] of [REDACTED] marketing business for potatoes, and [REDACTED] marketing business for onions, both of those businesses have business growth potential, with the customers. So it really is, one of the major, on probably 90% of the supply into the onion business, and probably be over half of the potato business. With both those we have the opportunity to grow and we'd like to grow as well.

Int: And so when you talk about the land that is available for you to rent, is it a case of people not being able to find someone to take on their family farm or what?

O: Yeah, so the opportunity's come around... ideally our two target crops are potatoes and onions. The best ways to maximise the output from both of those, or to optimise the output, in my view, is to manage all the other years in the rotation, so our primary target is to remodel [REDACTED] somewhere else effectively so that we can overlay a whole farm, a whole business approach. Both from an ecological point of view, but also from a field sustainability, in terms of looking after the health and improving the soils. So that if you like is our primary goal, but then we have to work back from that in terms of different timelines, so the 10 year FBT in [REDACTED] is probably the nearest things we've got to that, so we are farming everything. Before that, it's very difficult locally to hire potato ground, partly it's a combination of being fairly well done, very competitive, um difficult to manage pockets of. So the onions was a slightly easier one. I think all fresh produce sectors are continuing to consolidate and at different speeds, but the onion one seems to be consolidating quicker than

anything else we're involved in, so we have picked up opportunities where, on smaller farms, they've decided to go out of onions because they haven't got any storage, so they've been selling green crop to a packer, the returns are absolutely awful, so they've got no money to invest in machinery, they can't invest in storage, there's just no money for it, and they are too far from the marketing to be able to carry any kind of margin. But they would like to keep onions in their rotation, so we've been able to partner (with a very small 'p'), we've been able to go and keep onions in their rotation and depending on where they are we use different elements of their own infrastructure and hardware to do some of the contracting services, so it gives them a level income.

Int: So that was my next question, are all of those... well I need to ask about the irrigation here but I know that it's been very much invested in, but is your whole farmed area irrigatable?

O: Yes, apart from [REDACTED] we can do bits of it but not all of it, so that's sort of using water straight out of the dyke up there. In terms of the remote onion land, it's all under irrigation (we wouldn't grow onions where there isn't any), and that's in all sorts of different formats. A large proportion is from reservoirs on winter-fills, and then most of them have got some underground main infrastructure for distribution. Some of them are quite 'gun'-heavy, so we are trying to encourage a bit of booms here and there, but I suppose there systems and that are not quite as developed as some of ours, so you know they tend to be smaller ringmains, fairly simple, a couple of machines, one pump and away you go type thing, rather than a very complex system which we run here.

Int: And how would [REDACTED] approach making investments in irrigation on the land that's rented in?

O: So what we recognise through the payments that I make for irrigation, effectively what I've tried to do... because the industry is poor at... there's a benchmark figure, it's going to cost you you know, £100 for 25mm on a Ha, you know, that sort of ballpark. And that's just bandied around. Well, you say to people, you know, what's behind that number? Because we cost ours all the way down to... I know that £100 is far too expensive. And I've tried to encourage different cost matrix. I've managed to do it on one of them but the others have been really difficult. So what we do, we either pay an inflation on their land rent to recognise infrastructure costs, running costs of irrigation and also license payments, and then we pay an additional rate for water on top of that. I've got another one where we actually have a baseline cost for up to 15mm of irrigation, which covers off all of the fixed cost element, and then if we go over 15mm it then becomes a variable cost, so effectively it's just charged on however much we use beyond that, because really the fixed cost element shouldn't be any more if you are going beyond 15mm. So that's what we've tried to do, now my assumption is that there is, that that money that I'm paying for that has the money for them to reinvest in their irrigation infrastructure and keep it optimised that it's not going to fail and it's not going to be inefficient for me.

Int: So you wouldn't be making any additional investment outside of what you are paying to rent the land, and then they would be the ones that are in charge of making the decisions about the irrigation infrastructure on the farm.

O: Yeah, we wouldn't do any additional payments, Lincolnshire we may consider it, but that would be in conjunction with the landlord. So it becomes a tenancy improvement. Where I'm just doing single year land rents I wouldn't do that because it's um, if we were doing the whole job, on a long term, we'd have a different view, but because we, you know, where we go, the intention is that we are there every year, so we are not just 'in and out' guys, but I'm such a small part of their whole farm, that really, that's for them to decide how they invest their money.

Int: So you don't have any guarantee beyond a year that's really...

O: No, we do like a rolling year annual agreement, so like an annual cropping license. I wouldn't, I'd be nervous of, certainly in the short-term I'd be nervous of doing multi-year agreements because moving onto different soil types, onto land where onion businesses are not reinvesting, maybe there's an amber flag there, you know, there's a reason they are not reinvesting. So we've just got to be careful we don't walk into somebody else's problem. So I need to understand what are the glass ceilings in terms of their development, to see whether we can remove them, and if not, then we withdraw and go somewhere else.

Int: And do you think the ultimate goal would be to purchase land somewhere else?

O: I think the ultimate goal would be to have management control. However that's wrapped up I mean that can be flexible. I don't think we are purchasers of land, I don't think our intention is to... Well, no, our intention is not to go out and buy another [REDACTED] estate, but what we promote as maybe a USP is our practice and what we do here. So in terms of, and I think that's why we won the [REDACTED] FBT, is because the landlord came here, they had a good look around, they looked at all of our credentials and everything we do here, all of our work practices and that and wanted their asset managed in the same way, and that's what I put across to them. Whereever we go and manage, you know, if we are doing the whole job we will manage your asset as we manage our own asset, which is a 100, 200, 300 year timeframes.

Int: And you have a brand to protect?

O: Absolutely, I'm looking after the [REDACTED] brand, but I'm also very conscious of my McDonald's, my Greenvale, my McCain's, my Sainsbury's, Tesco's, Waitrose, M&S. I'm managing all of those brands at the same time as well, so we have to be absolutely um, we have to do the job to the best of our ability. But you can only do that if you are doing whole farm management. And that brings in quite a lot of compromises a lot of the time.

Int: So what, you presumably have lots of different water sources that you are using, and using both groundwater and surface water, I mean I imagine it's probably quite complex?

O: Here we are pretty much all groundwater, so in terms of our licensed volume we would be something like 90-something percent groundwater. We have two small surface water licenses, but we don't have a lot of surface water around us anyway.

Int: And do you have any reservoirs here?

O: Two. Yeah, so strategically and geographically they are on sort of Eastern half of the estate. The reason for that was sort of multi-angled, but by having a head of water that we can carry from one year to the next year, we are able to buffer some of the risk, so we can carry, I think it's about 22% of our licensed volume from one year to the next year, so it gives us the ability to have water to go out in a very dry year. The problem is that, well I say problem, but the other benefit which sometimes is a slight negative in terms of carrying water forward is that what it lets us do is to pump a lot of water fairly quickly, so we can abstract from the aquifer, but on the eastern part of the estate, the chalk is quite tight and not fissured so much, so test bores and production bores haven't been quite so successful because we can't get the water out quick enough, so the reservoirs primarily pump Eastwards, but then also support higher pumping rates on the rest of the estate as well. So the sort of tactic for them is that when we get to sort of into May and heading towards June which is our real sort of peak scab irrigation, everything wants it, I try to leave the reservoirs alone even then, because I know once I touch them, if it doesn't rain by the time I get through August I'm going to be a bit squeaky as to whether we've got enough water to keep going.

Int: So they are filled from groundwater?

O: So they are there to buffer that main part of the season, and we would then manage them and the... as irrigation demand drops off through August as onions and spuds come off and into September, what we would then do, subject to how much water is in them, if they were very low I would then slow them right down but keep pumping through the boreholes or vice versa if there was a lot of water in them and we were going to use some of them, we'd use it from them and not stress the boreholes, but then once we get to the end of the season we then top those reservoirs up before the end of the calendar year so that we can then carry that water forward into the next year.

Int: So it sounds like you are very reliant on groundwater, you don't have enough in the reservoirs to get through a year for example, and if you had a problem with the groundwater, if you had very little rainwater in a year and it wasn't replenished, what would happen?

O: So I would hope that with the groundwater, I mean obviously we've got decades of groundwater data here, so we've got a fairly good idea of how in different seasons as to how groundwater falls away and recovers. So that, sort of doomsday scenario, we haven't quite seen it in yet. In terms of where we're exposed with our reservoirs and what we do, it's if we go through a second dry winter, so if we had in '10 and '11, so effectively we were able to fill the reservoirs just about in the first year and use it in the second year, but because it was very dry in '11 they were very low and we hadn't refilled them all going into 12, and then of course the weather broke and we were able to, well we didn't need to irrigate for several months. But, then into the third year, that would have been a real headscratcher because going into the next year, well into that 2012, we had already effectively agreed a voluntary 85% reduction with the agency on our licenses as a abstractor group locally. Now that would have meant that we, that would have been a tough decision to make if the weather hadn't broken. I'd have probably pre-empted that by saying, I'm going to risk it, I'm going to chance it... I mean that sounds... it doesn't sound as haphazard as it sounds, but the choice with an 85% voluntary restriction is do we cut our cropping, our demand, by 15%, or do we grow 100% and hope that we get a wet year. So I went for the hundred percent, and backed the, "we won't get a third dry year", and we got away with it. If we'd have then gone into another dry year, A) we'd have been caught out, and B), going forward, we'd have had to have adopted a lower risk approach. But we kind of, in a normal year we would budget on using most of our water and in dry years we'll use 100% of it.

Int: So that agreeing on an 85% reduction, you are not just not using your headroom?

O: Correct. So our business, where we are slightly different to a lot of business, is our business model has always been, 'optimise your assets', and water is a valuable asset, so optimising it means, in an average year, using as much of it as you can. So I don't plan a big headroom in my water demand. My bigger challenge is actually trying to make sure that we get a good spread across all crops because if it's dry in April we'll start irrigating winter barley, and if it's dry in September, we'll still be irrigating carrots and parsnips and everything in between. But I haven't got enough water to do everything so I have to kind of make some assumptions with regard to historic weather patterns. Well, usually August is wet, so actually if I don't put too much water demand in August I've got a bit more to use in the front bit. But it's real crystal ball-gazing time. Last year because it started so dry and wet it felt like it was going to be a drought year the whole way through, so actually I started restricting myself early season so I could hold water back, hindsight that was the wrong thing to do but... well that's hindsight.

Int: So did you make a loss last year in terms of, was the quality less good than it should have been, or what was the implication?

O: In terms of '17 crop we have had lots of quality problems. I don't think we can pin any of that on restricting water, because I wouldn't restrict the water on the key veg crops, so if you like my approach to irrigation is very much a tiered priority, so you know we've got cereals at the lower end and then we'd run through to packing salad potatoes at the very far end, and then everything in

between. So if water becomes tight if we can't pump it hard enough or if we haven't got enough people or we haven't got enough infrastructure, then I always work back down my priority list.

Int: So it's almost like your headroom is what you use on those lower value crops?

O: Correct. Yeah, so I am trying to utilise my headroom, so that we are using that asset to turn into pound notes, but exactly that, my headroom is crops sacrifice, and I have, over the last 15 years I have probably in the two or three years deliberately held water back in things like carrots and parsnips, and suffered yield losses as a consequence, but I've had 65% of a yield. So we've achieved something and we've managed our water appropriately and we've been able to turn it all in. Yes we've had some yield loss, but actually that's been a result of the weather and not because we haven't used the water elsewhere.

Int: So in terms of, I guess the quality might be a bit reduced in these circumstances?

O: What I'll make sure I do is that I'll always irrigate for quality and then, so something like a carrot crop it can suffer scab early on, but actually if you can get it through that period, get the roots so you don't over-irrigate it, get the roots to go down after moisture they'll grow a long tap root, so they are more resilient. And then you are then watering up. The problem is if you water them too hard and get a big canopy, it then wants even more water to support the canopy, so actually canopy management is a bit of a trick as well. So hopefully we would never compromise quality unless we've got a physical problem, we just, I say just, but yield is the one that we'd miss. Unless it's quality on the combinable crop, where we've got a low yield so nitrogen might be too high in malt and barley, or protein's too low in wheat.

Int: Can I ask what percentage you are selling on fixed price contracts?

O: From veg crops? It would be in terms of area it would be... erm.

Int: I mean do you grow anything expressly to sell on the open market I suppose would be the better wording...

O: Yeah, the open market... We are kind of... My business into [REDACTED] is effectively open market. It's not a fixed price, so you could term that as open market, so all of that product is price to be agreed, and then we probably do a bit more on the side. I'd have thought probably somewhere around 20% of my spud volume is open market price and the rest would be on a contract. Erm, onions are primarily designed on a fixed price, but then that's only a part of the size element, so sizes that fall outside that become market-related, so very loosely I would think probably only 50%

of that is on a fixed price. All of our carrot is on a fixed price, 80% of parsnip is on a fixed price, and then combinable crops, it's as we market them.

Int: And have you ever had the experience of failing to deliver on a contract?

O: Onions is the biggest problem because onion yield swings are massive, they are the most variable crop we grow, and they can swing, you know, I mean, we would average probably 52-54 tonne/Ha green, but they can go down to 35 on individual fields and they can go up to 72 relatively easily, season-dependent. And even within the same season you can get, things yoyo around the middle, so in terms of being able to deliver enough quality volumes in to our onion business, yes I have run short in certain years when the weather is wrong.

Int: So what's happened as a result of that?

O: Yeah, so I would have a pre-planned volume with them, so I'm trying to match the area we are growing to match their marketing needs. In the short years usually if we are short everyone's short, so specs change and they get a bit more into the packing than normal, so the customer accepts a bit more. But onions are very, they are partly water-related, but they are also very sunlight related and temperature as well, so if you have a dull season there's not a lot you can do about it, you can be under.

Int: But you don't have to for example buy onions on the global market to...

O: No, well our marketing business might buy against it to fill holes, so they might have to go out and try and buy in a very difficult environment, because if everybody's short then the prices are massive. Theoretically all of our fresh produce contracts do have that written somewhere in the small print...

Int: That you will cover any shortfalls?

O: Yeah, but I have never been called on it. I got called once on a wheat crop for a customer who we don't deal with any more (laughs). He did it once and that was it.

Int: So do you think perhaps it's more about being consistent over so many years?

O: Yeah, so I call them the grown up customers. They are the ones who will look at rolling averages. They won't look at single years, because everybody knows we get peaks and troughs year to year. So they will try and ride with us. Sometimes that's a difficult message to get further down the

consumer chain, but at least they are fairly good. How it might manifest itself would be if we've under-performed for 2 or 3 years then what they would probably do is say, "look we need to have a conversation about how much volume is on your contract, because as you are consistently not doing it, you are over contracting". So they would then look to reduce their risk.

Int: But it sounds like, in your opinion, the cost of having a shortfall because of a water-related risk is not entirely borne by the farmer, it sounds like to some of it is borne by others..?

O: Um, we bear a lot of it direct because obviously if we are not producing, it's money off of our budgeted income. The production chain needs to be able to absorb, so it needs that level of flexibility up and down it. I think that gets... the bigger the problem the harder that becomes and I suspect that.. the problem... the big problem going forward will be that margins are getting shrunk and shrunk, so where you could maybe grow a contingency volume, you can't afford to do it now because you can't get that contingency volume into your contracted value.

Int: And that's because?

O: Usually free-buy is so poor, it's so low, so it's rare that free buy prices will be fairly high, or if they are around contract value, the years they do drop away, they drop away so far that it's just not economical to... you can't... you can't... you can't... erm, you need a high level of resilience to be able to tolerate it for many years over a run of say 5 years, so if you look at this year's potato price we'll probably contract values off the field at 110-120, free buy for the field would be probably 60. So if you are not growing contracted volume, or if you can't get contracted volume, you can't afford to grow spuds at below the cost of production... £60 is way below the cost of production. So, and it's, the other thing is there are so many other factors that affect quality, and things like losing a lot of our pesticide armory means that we have so many more problems that we are trying to solve in an integrated way, but when you have multi-pronged solutions to single problems, the risk goes up, because you only want one of those to not be right and it all unravels. So actually the view I'm taking now is that I need to try and de-risk some of our production, so that will be about fixed price business, but it will be looking at, what are our, over the last 5-10 years, what are the common factors that go wrong in terms of crops not meeting what they should be doing and just actually pulling some of that away, and actually, as I say, without, where we were as a business 20 years ago, you'd quite happily grow 10-15% contingency on your volume, because if you didn't move it and it went to the cows, well it was kind of okay because there was enough left in the job on what you did move to enable reinvestment, but now all of that headroom has been eroded, so actually you can't carry any kind of contingency. Everything you grow has to go in. The problem is meeting that when you come under with a shortfall, because you don't want to be underneath. So it's a lot harder to hit the sweet spot.

Int: Is that to do with global economic crisis...

O: Yep, continued devaluation of food.

Int: And entry of Aldi and Lidl to the market?

O: I think there's all sorts of anecdotal reasons for it, I think certainly in the UK you know everyone will say food is undervalued in terms of what people spend on food in comparison to what it used to be. That might be right or might be wrong, I don't know. I think that what the problem we get is that, I've been to several conferences and at the end the retailer will stand up and say, "we've got a duty to provide affordable food to the masses". Which means they need a very cheap product. Now it's almost impossible for us to grow a very cheap product when they keep eroding all the other tools that you need to grow a very cheap product. So you know, the minute you take, you know we are caught in that malestrom where they are eroding all the tools that we've got to do the job, but they want the job done cheaper.

Int: They mean regulations...?

O: Regulations but ultimately the consumer. The consumer wants cheap food but then they also want, they want all these various things because somebody to the left is telling them that these things are bad for the environment or whatever it may be, or bad for them. Which is all completely out of context. So they get that message to put the pressure on there so it all becomes a vicious circle, people want cheaper and cheaper food but you get less and less opportunity and more expensive ways of solving the problem. Which is counter-intuitive to food prices going down. So sooner or later it will be the point that actually, well businesses will just say well, "can't do it". And I've talked to farming groups and things like that and I say, "At the end of the day, don't moan unless you are prepared to walk away, because if you are not your threat is idle". We are sort of, as land managers, as asset managers, the biggest single asset is the land and what it sits on, so actually, you can't compromise that asset, you've got to look after that asset for the long term, and if it means that actually you are compromising it by trying to produce things in the wrong way very cheaply, you are better off just shut the door, look after the asset and wait until the f... the world realises it does need feeding, and this is how we've got to do it. Because otherwise you know... but it's going to come to that at some point because there's just so many pressures all pushing on the centre that sooner or later it will go pop.

Int: I guess the difficulty is that there will be cheaper options available from other parts of the world where it doesn't cost them so much to live.

O: Absolutely. But I get really irritated maybe because the moral dilemma then comes in, because if people within the UK and our consumers morally don't want us to use these products, and morally don't want us to over abstract water, why are they then prepared to import even cheaper produce where people are paid below the cost of living, in even more water-stressed areas, where they use products that years ago we've stopped using? It's completely immoral. So why do they do

it? You know surely, I'm quite happy you know, so long as the whole thing is water tight, and that's how people want to produce food then that's what we'll do, and we'll say, well look, this is the cost... to be able to reinvest, we need this level of headroom as reinvestment profit, people hate the word profit, but you need profit to be able to reinvest, but that's fine, we'll do that, but then don't go running to taking stuff out of Spain and Africa where nobody's got water to drink because you are buying flowers or fruit or things that are out of season, or cheap carrots, because we can't do it here at the cost that they can. (38 minutes)

Int: So this is a question that was going to come towards the end of my interview, but it's appropriate now... where is the power within the system to address that problem, that consumers maybe aren't really assessing the environmental impacts of the food that they are getting from overseas and maybe aren't thinking about water scarcity when they buy tomatoes that come from Spain or... Is it a case of just educating consumers or...?

O: No, because I think the consumers are led, you know our customers and retailers tell us this is what the consumers want... that's rubbish. They tell the consumer what they want, because they feed them the story, and they put in front of them what they want, and then dictate. You know again, what irritates me is that nobody will deal with the tough questions. You know I sit in various focus groups and things like that, and the test of cross-sector work and focus groups is... okay, that's all fine and all the fluffy stuff, but actually, here's the nitty gritty, this is the problem. We've got to produce food, how do we do it. People are trying to take away glyphosate for example, neonics... Well glyphosate is such a key component of.... not that we do any here... but for those guys that do non-inversion, min-til, no-till. In terms of trying to keep nitrates and phosphates out of water. It's a massively key component for it, but you want to ban it? So you just take ten steps backwards, don't you? But nobody gets it. Nobody will debate that point, you know they won't have that point. So, to me I can't see where the power is currently. Yes, there's lots of little drip feeding, but it only drip feeds around the edges. It doesn't go wham, let's go to the heart of the problem and get it out. And you know when you've got governments that want to be re-elected, they don't want to upset the people that fund their parties do they, so they are not going to upset retailers, they're going to try not to upset NGOs because they are too worried about losing votes. I don't think you can have any kind of sustainable countrywide policy on a body of people that re-elected every 3-5 years, because how can you take a long term view?

Int: Yeah, we need a life dictatorship (laughing).

O: There is, dictatorships the wrong word, but there is such a, this is really completely left field, but in terms of thinking about things like monarchy and things like that. Yes, if you've got a bad one you've got a lot of problems, but you need something that's a constant across the ages that actually has some of the, just very high level, strategic core values and direction under their control. So you need that sort of central body. You know, I joke about it... put a farmer in charge, because we have to absorb everything and come up with a solution and that's what we do. In terms of, everybody that gives you problems, they are single issue people, so they are not problem solvers. So I'd put farmers in charge! (laughs) And I'm up for the job! But it just needs someone to say, okay, well

everyone sit around the table, I hear what you are saying, I hear what you are saying, I hear what you are saying (gesturing). Here's the problem, we've got to produce food, we've got to look after our water supply. Now you all live in an ideal world, but actually in reality (which is what we do as farmers) we don't live in an ideal world, we have to compromise, so we have to compromise in a measured way and understand it, and then how do we build a long term policy from that? Soap box moment over!

Int: No, that was good, that was really good. That's the end of the interview covered because I was going to talk to you about power in the system, so that was really summed it up pretty well. So I was going to ask you about your licenses. Are they time-limited? 43:02

O: Yep, so they were...They used to be licenses of right but they were converted to time limited, something to do with... I can't remember if it was to do with putting on the private water supply, or absorbing the private water supply. I can't remember exactly what it was because it predates me and most of the people here, for definite. So yes they are all time limited. We've obviously just come through our three year evaluation period, so our time-limited licenses have, all bar one, they've all been renewed at 100% of what they were, and that's because of our business policy which is to utilise the asset, use as much as you can and so in at least 2 of the qualifying years we've used 100% of our license. What really worries me, and this is where the whole policy... I can understand what they are trying to achieve, but this where people try and achieve things in the wrong way, through regulation. Now everybody's going to be minded, I've got to include myself in that... How do I manage my water for the next six years? Is the regulator going to say, "well, actually, your next evaluation period is this next six years". They are not going to tell us that now, but actually when we get to the end of that, if I haven't used all my water in those six years are they going to say, "well, actually, we are going to take a bit more". So is this a once in a lifetime job? Is it once every six years? Nobody knows. I mean again, there isn't this long term view and strategy at the heart of it. So at the back of my mind, and all the other abstractors, if they've got any sense, will be thinking the same, is in one of those six years, I've got to pump all of my water. Which makes irrigation really inefficient."

Int: So I was going to ask, what does that mean for the resilience of the farm and the resilience of the catchment?

O: I worry that actually what they've done is they've potentially made the catchment more vulnerable because whilst it was over-licensed and they were suggesting it was over-abstracted, the catchment actually is in balance over 12 months, it's just that the water comes at the wrong time of year when you can't... so that's a storage issue, not an availability issue. Which is a completely separate thing, but there's, you know, all agribusinesses were trying to be as efficient as possible with their irrigation before we got to you know three years ago, and we would have been here, but it's just that our approach is different in terms of the asset management, but other businesses would have been carrying lots of headroom because they'd have thought, oh, if we get a really dry year I've got forty-fifty percent of my water I can fall back on. They've been penalised for that now, and that's gone. So they've lost their headroom, so now do they, all of a sudden their businesses are high risk,

because they've lost their headroom, or do they reduce their production, which makes them, obviously, less efficient, and or you are going to get people that on year 4 or 5, if we've had the first three years are wet, they are going to be sitting there going, "I've got to put water on something, so I'm going to put it on something that, just so that, you know, I'm going to over-irrigate something at certain times of year, just to get the water pumped". That's bananas! Because it puts cost and inefficiency into our business. Threatens quality. It's not the right thing for the ecology and the environment, it's just... You know, I can understand what you are trying to achieve guys, but you've got it wrong!

Int: can you see another way to achieve it?

O: I think there are, you know some of the things that came out of where we get involved in cross sector work, is, erm, I quite liked the New Zealand model when we had their guys over where they effectively have water body or catchment managers, so rather than say, "well actually we'll take this water away", I think there's got to be local solutions to local problems and everybody's got to be aware of what the local problems are, so it's got to be communicated, and to my mind it's got to be, government's role if you like, central government should be there to support academia, so for example if the river environment agency came to us, or whoever, came to the catchment or water body and said, "we've got a problem with this stretch of the river, this is the problem, there's not enough flow, or there's diffuse pollution or whatever there is. Over to you guys", and then the management group can go, "Okay, what's the problem, do we need some analytical work?". And then there's this academia structure that you can just tap into at any point and go right, "we need some support with this, this this... what's the scientific knowledge around this? Can we do a bit of work". The results come back to the forum and the forum then go, "actually, the best way to solve this is to do X. This is our proposal, we'll go out and do this and we'll monitor it over the course of time, and everyone's a winner". So to me that's the grown-up way of doing things that fund academia, fund the knowledge, fund the science, but let the practical people on the ground come up with the practical solutions to the problems. Don't come up to them and say, "ooh, we haven't got enough flow in there so you can't have any more, we're going to take the water away". It just goes backwards for food security, you know, food prices go up and the whole thing unravels. You can't afford to put... Unfortunately some businesses will probably... best practice is probably the first thing to go, unfortunately when costs come out of your output, profit comes under pressure. It shouldn't be because it should be the thing you hold on to last, because it should be most efficient, but you know I go around businesses where the first thing they do is just take that away, blinkers go on and go back to default.

Int: So talking about irrigation efficiency, what would your definition of it be?

O: So my aim here is that as much of, well it's impossible to be 100%, or no, it's not impossible to be 100% irrigation efficient, because you can, but then you run the risk, you are not optimising crop yield. So I could design a system and produce a set of numbers to say, and management practice to say we are 100% efficient with our irrigation, but actually we are not, because we are not optimising it in yield. So for me it is about getting as much of what we put on into a crop as possible, so it's not

going off or it's not going through. So some of the work we've been doing for decades has been trying to look at drainage points, to understand where we get them, why we get them, how can we mitigate against them. Trying to look at, is smart irrigation a way around that, or even smarter and precise, with Lola we did that precision irrigation project for three years looking at could precision irrigation be even more precision, and in terms of what we were doing, the answer was, possibly, for a very small percentage, but to achieve it was going to be mechanically very very costly, so prohibitive, so for me it's, you know, nothing goes off the field and we have as little drainage events as we can.

Int: So if you were thinking about that in the context of... try to answer this honestly, but it's a hypothetical question... If you think about a use it or lose it situation would you be aiming to try to reduce the amount of water that you were using, or would you be aiming to use that water to expand your production?

O: I would be aiming to use what I've got better, so you know a little simple thing like, if we could design a (and this where people get blinkers on a little bit, machine manufacturers)... in our veg systems, 20% of the field area is a wheelie, well if we could not apply water to wheel-on, theoretically we could make a 20% saving of water, or use that 20% elsewhere. That's an engineering challenge, nothing else. You'd think the solution was relatively easy, but when I've spoken to people like xxx on the booms and said, what can we do about a bespoke boom, nobody wants to do it. So we want to do that we've probably got to do it ourselves. I'm really minded to do it because I just want to do it and show what can be done, because it's absolutely the right thing to do. A) we'll save some money, but B) again, come back to, you've got to be seen to be doing... it's got to be best practice all the time... you've got to be seen to be doing the right thing. Things like drip don't work here, because there isn't any lateral movement of water in the sand, so we drip fertigate Christmas trees and hedges and things, but you can't do it with veg, it's too restrictive. So at the moment, nozzles on booms and linears is the most efficient way of putting it on, but actually if we can design mini nozzles that just ran on a bed and not on the wheelings, that would be really neat.

Int: And what about scheduling, how do you organise that?

O: So scheduling, so I use combinations of neutron probes, we use the environs cans, we've got a lot of enviro scans as well, erm, and fork, spade, weather station, rain gauge, experience, so what I'll try to do is bring all of that lot together and look at the stage that the crop is in of it's life cycle, so it's risk factor, effectively, and then my approach to scheduling would be weighted slightly by the level risk at that time of year for the crop, so for a high value packing crop that's prone to common scab, my scheduling will be lower risk than if it's a processing crop, then I'd run it slightly higher risk and wait for a bit of rain and things like that. So again some of the work we've done with [REDACTED] which has been really good for us has been trying to understand a bit better different varieties resilience to common scab and how they respond. That is such a massive piece of work, you know, that's just years of work in itself. But it's given us some confidence in terms of the published susceptibility table that they do, so that's good. But basically it's bringing as much technical input as you can and

combining it with as much experience and practical assessment as you can. Put the two together, and then depending on what the weather pattern is I'll produce an irrigation schedule, because we have... because I can't run everything at the same time, everything has to be sequenced, so at any one time we run the equivalent of 45 hose reels on the system, but the fleet is a lot bigger than that so we have stuff ready to go, so what I'll be doing is scheduling the first lot, and then the second lot and then the third lot, and then it's just a case of sort of keeping all the plates spinning as you go through and then reassessing if you get a rain or if you get very hot dry weather and that. So every field, every run of an irrigator has a schedule, it has a date and a volume of when it's got to go out, because all my assumptions are based on that, so I get very OCD about checking all the guys do that when it says they should be doing that, and at the right volume because if the volume goes on wrong my assumptions are then wrong. So when I come back and dig it, or when I look at a probe and think, "Cor that's a bit wet", if they've put too much on it's not because my scheduling is wrong, it's because their application is wrong, so you have to be really careful with that.

Int: I can imagine you must not sleep very well at night sometimes!

O: Yeah, it is... You have to live it. And technology is starting to help now, so moving to the enviroscans I have rain gauges on every one, so I can now see irrigation events quantified, whereas before I'd have to ask. We do a lot of cross-checking. It is, I think the next thing, and I've spoken to various people about, it's really interesting how soils behave differently depending on the ground cover, and sometimes they behave the inverse of what you think they would. So some potato canopies once they've got a good groundcover will actually use less water, than if they've got a lower ground cover. So, but you know theoretically I'm told you can only evaporate from a very shallow depth, so I can't quite see how that accounts for all the differences that I see, so whether it's just the fact that they've got a bigger canopy, they've got a bigger root system, so they are pulling it from deeper, so it's less impact in the top... I really don't know, I don't understand it, but what I'd like to be able to do is to be able to see ground cover and canopy depth (I get poo-poo'd by people at [REDACTED]), but I still think I'd like to see actual transpiration rates. So whilst we have a single weather station on the estate, to me if I had a sensor in every crop that was measuring ground cover, canopy depth, real life transpiration, I could get my irrigation scheduling even more finely-tuned than it is, probably. And it's just where I get a bit self-critical is where you get an unforecast rain event you think, you know, "could we have waited?". You get a 50% chance of 5 or 6ml and you go (sighs), because you can't catch up, you know one thing with our system and our soils, if you get behind, you can't catch up until you get a rain event, so if I don't get a rain event I'm risking the income of this business. I can't afford to run high risk irrigation practice.

Int: So you've been talking about putting a fork in the soil alongside the technology and that's how you approach it. Can you imagine a time where the technology just takes over and you won't even need to go around and have a look?

O: I think technology is... I'm getting more... I guess it's a case of proof-testing the technology, so what I've done with the enviroscans... we've been running them for a number of years now, but effectively I've been proof-testing them against my own.. the way that I would schedule using

neutron probes and physical assessments. And actually I've now got very good confidence that I've got a very good correlation with them. Probably I've got a better correlation with them than I have with the neutron probe now, so I'm actually tailing away the neutron probes and putting more enviroscans in. What that let's me do is with that confidence of better correlation, with some of my lower risk crops I actually haven't got to bust myself up about visiting them quite as often as I used to, so it can become a bit more autonomous. I'm too old school to let it be completely autonomous because I think it would be wrong in an uncontrolled environment. If you were indoors, no problem... great, trust the technology. But we've got so many variables on a field to field basis, and every one of those fields (there's over 200), every one of those is an individual. You know, they behave in completely different ways under different crops and you've just got to get a feel for them, you know you can't beat going out and standing and just thinking yeah you are going to pay me up at the end of this.

Int: Do you see that your farm manager's role is becoming more complex over time and individual farm managers are having to manage much larger... we've been talking about how there's a consolidation of businesses producing different types of veg in the UK, so is it becoming a more difficult job for the farm manager?

O: Definitely. And that's where we need technology to help support us because my biggest challenge from an irrigation point of view is not the big footprint here, it's actually my five little footprints, because they are not on the same wavelength as we are, so they are very difficult to say, you know, I'll schedule an irrigation and say... you see I'm almost having to schedule an irrigation now by factoring in an inefficiency factor because I know if I say can you irrigate that in two or three days time, it might be three or four days time before they get there. So I've always got to factor that in, which is a terrible way of doing things, and I've got no confidence that it will be accurate, so hence electronic rain gauges everywhere. So I'm short on confidence it will happen on time, short on confidence it will be the right volume, and because my default position is they should know their soils better than I do, usually within two years I've come to the assumption that they bloody don't! I shouldn't sound bigheaded, but actually I just don't think they get it.

Int: So there's a lot of knowledge and skill concentrated in the role of a farm manager who's doing their job well, and there's less farm managers around that are doing their job well. Do you think that is a source of vulnerability?

O: For the industry I think people is one of it's biggest vulnerabilities. So, there aren't, I mean there's big drives at the minute, but it seems to ebb and flow a little bit in terms of getting good people into the industry. There's been some great talk for the last five years... I haven't seen a lot of production out of it if I'm honest and if you go back 5-10 years you know colleges and universities have been talking the talk, you know, "we're going to do this, we're going to do that, we want your input, help us with this", so you go along and you do everything and nothing comes out the other end. So that gets a bit disheartening, because then somebody goes and somebody comes and says the same things and you think, "well, we've been here before, and nothing happened". So I think it's a real problem, I think the industries got to completely change how it thinks about how it manages and

approaches food production. It's got to be more appealing to a completely different sector of people perhaps that it hasn't appealed to before, but to be able to do that it's got to change how it runs itself. However the problem with the variability of the weather is that it's ability to change is compromised by the returns we get in. So for example, you know, younger people coming into the business now, the work life balance is more important than ever... it was always important to us but you just had to do it when the job was there, but you can't get people to come in and do that now... very very few. So actually you might miss good people because they want a weekend off. So how do you accommodate that, and I've thought about well, do you have shift systems, but actually then if the other person's other half isn't on shift system and they are off during the week, that's a problem. So shifts, although there's so many industries that are built on shifts you think, yeah, it might be a runner... Do you otherwise, the only other way is to carry even more resource, so in other words you've got to have two fifths more of everything, a) to shift people, but b) otherwise you've got to do everything in 5 days and just say well do you know what we've just got to shut the shop on a Saturday and Sunday and do nothing. Fresh produce doesn't work like that because it will spoil. If it's been wet for 5 days and dry for 2 days, can we afford not to harvest without it spoiling again? So there just isn't the flex and capacity within the fresh produce sector for it to be able to evolve into what it probably needs to look like to get more good people into it, so therefore I think by default we are going even further down the mechanisation and technology route, which I'm not convinced is wholly the right thing to do.

Int: What worries you about that?

O: Proof of concept. You know I love blue sky thinking, I think people often don't go far enough with it. I think that there are too many people you interface with that are, they are probably all trying to do the same thing, so there's between 6 and 10 people trying to provide you with exactly the same service, but in a very slightly different way, and you think what a waste of resources this is. You know, again, if somebody got together and said "you look at that, you look at that", you'd probably use the same amount of money and probably look at four different things rather than just looking at one. So... barmy. Um. And the, in terms of people delivering, actually the technology delivering what people will tell you it will do, isn't there. So there's no data behind anything they've done and they've got no... there's no weight of data. So they come in and say (we've been there, we've tried it, we've looked at the new start-up companies), you say, 'great, okay, we'll invest in, we'll pay a subsidized rate for you to learn, we'll invest in it', and they'll say, 'Yeah, we'll be able to show you this, this, and this'. And you get to the end of the year and you go, okay, 'well, where's that, and where's that?'. 'Oh yeah we didn't manage to do that and by the way next year we are changing our service because we don't think we can do that'. Fantastic, so waste all that money, all that time and it's gone nowhere. And then you'll get another that is very good and seems really really promising and the minute they get to the really good, looking promising stage, the big conglomerate comes along and goes (swipe), swallows them up and they are gone. And then they are either part of a bigger thing that means, yes you can have their service, but you've got to buy all these other six services as well, because they are a big national distributor, or actually the distributor or whoever swallows them up has got their own version so all they do is mothball and nick some of the IP. And it's so frustrating, because you think, 'God, that could really move things forward quickly'. And as a farmer I need to learn fast, and the best way for me to do that is to fiddle about, half field trials, do I have an impact. Take things to an extreme, put double of that on, half of that on... what happens? The sweet spot is somewhere in between, but have a look at the effects first and try and understand

why. The way everything is set up from a research point of view without being rude to research institutes at the moment, is that it seems to be very much really understanding the minutiae of the problem first, and then in ten years time we'll think about publishing it or rolling it out to find you a practical solution. That's not fast learning, and in those ten years we've probably gone bust. So, and sometimes it never comes out at all does it?

Int: Yeah, and there's a lot of focus on the scientific problems which are slightly removed sometimes...

O: I fully understand, I'm a great supporter of science, but you've got to have this two track approach, you got to have, get something out of the field, just make some broad assumptions, and even if you don't fully understand it, does it seem right, or not? Get a consensus of opinion and just try and build some data, because then you've got a few years of data to start building, even if it's collecting data, if it's a central probe or something that is collecting a whole load of nonsense, one day it will be of value. Why wait until the day that you design the thing and then wish that you had ten years of data to look back on because then you just lose time.

Int: There probably needs to be more research design that incorporates farmers and end users at the beginning of the process

O: Actually, it's got to be... that pure science element is an integral part of it, but it's got to come out and run at a different speed to, just get out there and learn some things pretty quickly.

Int: One thing I was going to ask you about was drone technology and satellite imagery and that sort of thing. Are those things you'd be looking to...

O: Yeah, so the company that I was probably quite rude about was a drone company! They were the one company that I'd selected out of about half a dozen, that I thought actually had something. They probably still have something, but I'm not sure now. Because I just think that they've lost the plot a little bit. And I think it's when, sometimes when companies grow you'll get one or two people who have a great idea, can see the light and know where they are going, and then they get too big too quickly, and they put people around them that are just not on message and just lose it. And before you know they've lost the faith and the goodwill of everybody because it's been mismanaged. So actually a great idea has lost the opportunity through poor management. So I think there's a bit of that going on. I think drones is a great example of, you know, someone designed a drone, and now they are thinking, 'well, let's find something to do with it!'. Well, that's nuts. The first thing they should have been developing was the camera technology, got all that nailed and then said, 'how do we get it round the field'. It's cart before the horse.

Int: I guess there are jumps forwards and then there's the need to work out what to do with the technology.

O: Yeah, exactly. So imagery I think has got a big part to play, but I'm yet to be convinced that anybody can produce me an image that makes any sense, that I can use as a management tool. They can all send me a whopping great invoice for it! You know I can easily... tens of thousands of pounds every year I can spend on that, on all sorts of imagery, and multiply it up, but does it return tens of thousands of pounds? No. Because it's all at such a pre-development stage. Again it hasn't been proof-tested, they've got no data. They came here and said, 'you know what we'll do a three year deal, we'll scan it for nothing', they'd be the guys that I'd be interested in, because actually they've got some confidence in what they are doing. Not the guys that want to charge me for harvesting my data to build their business. That's wrong. So I think it will quickly move away from drones to... the one person who was getting on very well was the fixed wing guy, but he was the guy that got bought out and got absorbed into a bigger company, so that was a shame. I think the satellite guys it's probably got some legs once they can prove that they can look through cloud cover and sort of even up poor light levels and things like that. In terms of um... You know I'm quite... yes to the overall imagery, but again I come back to the local, you know we need effectively an artificial plant, I'd like to be able to tap into real-time transpiration rates, tap into the biochemical pathway of a plant. I want to understand what it's taking out of the soil, how much and what's it short of. So actually, how could, could you stick something in that mimics that, that is also the same size as everything else around it, and gives me real transpiration rates. Then you could be really really accurate with your water management, because you'd know, you'd be able to supply and demand, you'd pick up all those pre-stress triggers, and if you could do that for common scab susceptibility, so that if you knew what the trigger was for that, you could pre-programme it. And actually there's a, it would probably be too expensive to do, but I've thought of whether we should have some centre pivots in here. Just to completely automate our irrigation of some fields. That would be really neat, because then you could use in-filled sensors, and automate the whole process, so you were completely optimising your timing without running a risk.

Int: And is that something you are still considering?

O: We've got a few fields that would probably lend themselves to it, so in terms of thinking about, everything comes back to how much detail can you measure to be able to make an informed decision? But actually you know if I put a centre pivot in and took out a few corners of fields, how productive were those corners? Well if I can measure all my inputs on that and all my outputs, if I could GPS my output in the corners, and know how much diesel was spent in the corners as well, I could actually say well, for the benefit of this, I might as well put that into an environmental focus area or something.

Int: Someone was telling me you can get centre pivots for doing corners now.

O: Yeah, you can get a trailing arm, I don't know about telescopic arms. Yeah you can get a trailing leg that folds in and folds out, but that one leg is as expensive as the rest of the unit (laughs). So it's quite an expensive way to do it, but if we can put fertilizer through it, optimize the water. The other problem is we can't move them, but...

Int: What about wastewater re-use?

O: Exactly, got to be careful about what I say because I signed an [REDACTED] a year or two ago when we were talking to [REDACTED]. I just had a... schemed an idea up which I floated their way, which. Hmm. The barrier to it is timelines. So I thought well this is a good idea, we can try this, thinking, in probably two or three years, if we put a pipe in there, did this, did that, I could be putting some of that on. But then the public sector timeline is 20-30 years because it's got to be scoped out in all part of a big project, go for funding, look out for council funding over the next ten years, and you just lose heart a little bit. So you know it comes back to this, what could you do quickly just to find out if it would work, first is, okay it's the right thing to do, but someone's got to have a real, long-term eye on it, which is great, and I don't mind things being long term, but actually we're running long term solutions, but having problems come at us that need short term solutions. So through water regulation restrictions and whatever they may be, all of those targets are really short term, but all of the solutions... A lot of the solutions are long term valuations. So the two are completely mismatched at the minute, so you need this, at some point, somebody's just got to draw a baseline and say, "Okay, we understand we need to get there, we'd like to be there today, the reality is we are going to give you 5-10 years to evaluate this and then we're going to put that technology in to test-bed it and try it. But if you haven't come up with a solution in 5-10 years then we are going to do this. At some point, somebody's got to buy us a bit of breathing time, because at the moment it's just too... it's at you too much.

Int: But you don't think that there's like an automatic problem with the consumers being worried about microbiological...

O: Yep, don't know. I think that comes back to education doesn't it? So, and context, which is king. Which comes all the way back to the retailers and the NGOs don't give people context. So yes, in terms of re-using wastewater, if you looked at the category of crops, there's probably a whole category of crops that might be processed or peeled or whatever that would be very low risk. You'd probably avoid using it on your high risk crops, and then your medium risk is then a case of doing the scientific work behind it and saying well actually if it goes through this process, this process, this process, or has this amount of dwell time in the reservoir you know you can't have something that survives over the winter in the reservoir, then let's prove. You know, our two reservoirs here we've tested them every month for probably 15 years now... a long while, because I was particularly worried about centre pipes and all the ornamental birds and geese that come and sit on the reservoir and I thought "cor blimey we'll have an e coli problem", so we tested them both and there's no difference between the two, irrespective of level. You can find background e coli and salmonella on them, but it never goes above a background level and once you measure it on the point of application it's so diluted you can't find it. You know that's a science based approach that

demonstrates there's no risk. So surely, simple approaches are always the best aren't they. So yeah I think it's potentially got legs, but in terms of what we are looking at there, you then got the problem of looking at, well was the greywater supporting the river flowing another way, so if you take that out and it doesn't go into a river... does that compromise the river flow? There was even a model that said you could pump groundwater straight into the river and use recycled nutrient rich wastewater... that was my holy grail. Which is not dead yet! But yeah there's a lot of barriers in the way, but it's not dead yet.

Int: That's brilliant I think we've covered everything. Have you got anything else you particularly want to talk about?

O: I don't think so. I think the problems exist at high levels don't they, that's the trouble. It's short-sighted.

Int: Yeah, there are systemic problems that are really difficult to address, and that no one person owns and it's very difficult to get people to see things in the same way. Everyone has different interests, and different needs and priorities.

O: Yeah. And the higher up you go the less they want to talk about anything. They get too scared.

Int: Well, I haven't managed to talk to any retailers and I imagine I'll just get the official line if I do manage to.

O: They'll just say no comment. And that's what really irritates me because they are, well they keep saying, "we want this, we want this, we want this", and when you turn around to them and say, well we need a bit of support on this, they say, "well, our position is we don't comment on that". It's only because you are too scared to put your head above the parapet and say, "here's a point of difference for you". And that's a coward's way out isn't it (laughs).

Int: Do you want a transcript of this?

O: Yeah, that would be good!

Int: It might be a little while, I think I've got about 12 interviews to write up now!

O: No worries.