

Interview with participant N - 16th February 2018

Int: What is the size of the farm?

N: So we are currently 1550 Ha of cropped land.

Int: And is that all owned?

N: No, that will be split between various agreements, the proportion which is owned I couldn't tell you at the moment, but I would suggest it's probably about 60%, the remaining 40% will be split between, first of all there's one year agreements, for potato land or veg land, there are a few three year agreements, and then there are several 5 or 6 year agreements, farm business tenancies generally, and they are generally rolling tenancies, with a couple of them we've been on 25 years, so they are reasonably long term. Hopefully they'll continue to be long term fields that we farm.

Int: So the potato and veg is mostly one year agreements.

N: Some. I mean we grow potatoes and veg on our own land. We've got other neighbours (we neighbour fields) where we are able to grow potatoes on their fields, or their block of land if it's a big block. We've invested in the irrigation system to go through their land, or leg off sometimes, to go through their land, and then we'll have one family, they farm it themselves, in every year we have one of those fields, a different field every seven years, within their rotation and that's been going on for 25 years plus. So we revolve during the rotation and we use our water, and they get a decent rent, and they continue growing sugar beet and cereals and whatever they want.

Int: So is it mostly to do with other farms in the area no longer having the ability to grow potatoes in a profitable way?

N: Yeah. Potatoes is generally a pretty specialised crop now, with specialised equipment from start to finish, with high investment in it. The irrigation infrastructure needs to be in place, and it's very expensive if it's not already there. And the marketing is becoming more specialised now with crops in general, potatoes, onions, parsnips. We've got customers we deal with on a regular basis and reliability of produce has been something that's been important for the potato job. So it's not that easy for somebody just to sort of... they need a lot of money and they need a lot of contacts to gain that customer.

Int: So over time would you say that the number of businesses growing potatoes is getting smaller?

N: It's drastically smaller. I mean there was a statistic that came out a few years ago, you know 5 years ago I heard a statistic that came out, and I can't remember the numbers exactly but it was something like, "if the current trend in reduction of potato growers continues, by 2027 there'll be one left!". It was something like that. And it was quite shocking because 30 years ago, potatoes were in many farms' rotations. They wouldn't sell them to supermarkets though and that's most, there's other markets to sell to but many potatoes are supermarkets, well in my dealings, and so it's become a specialist crop.

Int: And how does that compare with other things like parsnips, carrots, onions etc?

N: Yeah, that's quite similar. We don't grow onions, but I've got the soil for onions and the land availability, and onions would fit in well in the rotation. But rather than growing onions and selling them myself I've decided to rent out to a couple of growers, in a reverse situation to the potatoes.

Int: Is this mostly driven by the investment that you need to make in the machinery?

N: To some degree but to be honest it's not that that has put me off, it's the customer base that I don't have. I could possibly go out there and do it, but to some degree the workload would clash with the system that we've got, to suddenly drop a new crop in with a busy harvesting schedule in September, would really sort of change the make-up of our farm and labour requirements. So it's quite difficult to do that. And to spread the financial risk, I'll rent it out to someone, take the money and say, thank you very much. We've got risky crops, potatoes, veg, on the farm. Having the rent come in is useful, it's a worthwhile rent.

Int: And in terms of your confidence that those contracts get renewed, in terms of you growing potatoes on other people's land. I mean you said that you put irrigation to go across their land so you are making some investment in that land. Is that protected in any legal sense, or is it more that... how confident are you that you are going to continue to be able to use that land.

N: Are you referring to how do I know I'm going to have potatoes to sell, or are you thinking... my neighbour...

Int: The security of your ability to grow on that particular piece of land, in a system where more land is being rented rather than owned, is it possible to still have the same confidence about making investments in irrigation on that land?

N: Yes, so the systems that we've done like that, we've had confidence that we would want to grow potatoes on there, and if we had a major problem and got in trouble with the supermarket and our tonnage needed to shrink, we would probably rest our own fields and grow on land that hasn't had so many crops put on there. Not mess it up, because I treat all the land as if it's my own, but we give land that's had several crops of potatoes a rest and lengthen the rotation a bit. That's not a bad thing to do anyway. But as far as security goes with my neighbours, working with them, we just have to have conversations about it. The potato rent is something that they find attractive. You know, it's a high rent. It favours well with cereals grown on light land, very, very well, and it's a good break crop for them. So we weigh all that up before we invest in the irrigation infrastructure to go through their land. And also it's sometimes done as stages. You know, they'll have a part of the farm where it's quite simple just to spend £10,000 getting the pipe to it, and then there may be a part of the farm that's a bit further afield and we'll then leg off again, and go a bit further, or we haven't had situations where we've had to say, build a... well, we have actually, we've had one situation where we have built a reservoir on somebody else's field for supply of water so we can grow potatoes on that block of about 500 acres, you know for the long term. We've sort of linked up a long-term rental agreement on that block of land to pay, justify paying that big expense.

Int: Because you've made their land quite a bit more valuable?

N: Yeah, we have. And it's something they wanted to do because obviously they are happy to see their land has now become irrigable land and in the future if in twenty years' time, I think the term was, they've got a reservoir to use. And their value has gone up significantly. So they are happy.

Int: And in terms of things that might affect agricultural water use, you are juggling maybe using the same machinery on different fields, you can't necessarily take the machinery on at the ideal time for each field. Is it the case that with more rented fields you are forced to schedule things according to the availability of machinery, rather than according to ideal field conditions?

N: Um, with irrigation I would try and give myself enough capacity to cover the fields to the correct sort of level of risk. That's something that's changed over the last twenty years, I try and have the ability to cover the potato fields every four or five days. That used to be double that, you know and I used to just sort of take a chance on it.

Int: And why has that changed?

N: Because I want to be more reliable on the quality of produce I can produce, so I would take a chance on it being a little bit wet when the scab period was there and I would just sort of get by it, and you know, sometimes it worked and sometimes it didn't. I've learnt more about what's required now to keep scab off of potatoes during the critical period. With that knowledge and looking at the risk, I've reduced the lap time, as I call it, for the irrigator to go. I've bought more irrigators. You

know I won't necessarily put more water on, necessarily. Because in the past I would probably put too much on in one go. But I've just learned how it works more?

Int: And the quality demands are different today from what they were?

N: They are. Yeah. They have cranked up. I'm so scared now of having a field that's full of scab and having to throw it all away. You know, the crop we grow is slightly different because we grow a lot of these salad potatoes, the small punnets we call them. If you had a crop of the larger ware and bakers, we used to grow more of those type. If they were scabby, there's usually a market for a processing job where the skins don't matter to the same degree. With these little salad potatoes, they are higher value, but lower yielding. If they've got scab, you can't...

Int: You can't make chips out of them?

N: No, you can't make chips out of them. You could send them to a factory for processing and get them mashed up or whatever, but you don't get the yield and they are not really suitable for that. So you are left with a lot of money's worth that's gone wrong. And I don't want to take that risk.

Int: So in a way there's less flexibility with the smaller salad potatoes. Is there more demand for that kind of potato now than there was in the past?

N: Yes, there is yes.

Int: What do you think is driving that?

N: Well, it's down to what our packers sort of want from us and that's down to their customers and their buying habits and their preparation time at home.

Int: So driven by convenience?

N: There's a little bit of that yeah, and it's also a little bit more of a premium looking crop as well, it's a bit prettier, some of them go to restaurants for that sort of job, rather than you know. So that's what... our land is quite suitable to grow that type of potato on. It's reasonably free-draining and workable soils. Smaller potatoes need a finer sieve or web to get them out of the ground with and if you've got heavy cloddy land you can't sort heavy cloddy soil from small potatoes quite as easily as you can, big potatoes.

Int: So if you had a situation where you weren't able to sell... I guess I should ask first, are you growing all for fixed price contracts.

N: No, it's variable. Some are, some aren't. It depends on the year. It depends on where we want to put our risk. The contracts are done for a tonnage, in general. I don't get as involved with the marketing as other colleagues on the farm, but I do believe we aim for certain tonnages of size ranges of these punnets, with various different customers, and our area then is made to match that. If we want to have a few more to put on the open market, that's up to us. And there needs to be a bit of a buffer, a headroom as well.

Int: So you might plant 15% more than you have contracts for but basically the aim is to have a home for everything that you are growing?

N: Yeah, I do believe. Yeah yeah, to some degree. I'm not sure to what degree, to be honest, there is headroom and open market stuff.

Int: So if you did have a year where the quality wasn't up to scratch for a water related reason, it could be that there was water-logging, or you ran out of water I suppose. What would then happen? Does your contract specify that you'd be penalised?

N: I don't believe it's defaultable. I don't believe our contracts are defaultable. Because you can get in a real muddle with that. I think the aim is that "we'll grow these for you, this is the area we are growing for you", you know. But the main thing is, I believe, which has led to us gaining market share, is because we have been reliable. We've been reliable in wet years, we've been able to harvest, and get stuff to factories when things have been waterlogged. And in dry years, when quality's been under pressure and yields have been under pressure, in general. Reliability of produce is really important.

Int: You've been a bit more resilient to those impacts than others?

N: Yeah.

Int: And what has made that possible for you?

N: Erm, well our soil type is fortunate in that we've got good land that we can work on. We look after the soil as well, but many people do that. But I do feel that we look after our soils to enable them to

be worked when... to enable free-draining and worked when perhaps other soils wouldn't be in quite so good shape. And, so that's allowed us to go in the wet years. And we've had good irrigation capacity which we've built up over the last, well, fifty years. To enable us to cover the land suitably when it's dry. Like I saw, in the last ten-fifteen years I've moved away from a longer lap time with irrigators, to enable me to get round when it's dry. Because I've just been finding more and more that it's been necessary to do that. And they are justified. I mean I have a field that's scabby and I couldn't sell it, it would have paid for three irrigators. You know, so the irrigators are expensive... the whole irrigation infrastructure is massively expensive, but it's expensive in a negative way losing a field of potatoes, if that was to happen.

Int: And you'd be losing by not selling, but would you have to buy in or pay for the cost of the shelf space?

N: I don't believe so. No.

Int: And are your main customers supermarkets?

N: It's a mixture, so we sell direct to [REDACTED], last two or three years. They've got their own pack house, which they process potatoes on. And then we sell to other packers, merchants, that then sell on to various supermarkets.

Int: And with it being quite expensive to make investments in irrigation that are going to permit you to continue growing potatoes, would you say that you are in some ways less likely to swap to other crops. As in, once you've made that investment would you need to make sure you continue to grow a higher value crop to make sure you get returns on the investment you've made.

N: We are looking to grow the highest value crop possible. Some fields aren't suitable to grow salad potatoes on because of soil-borne issues that have built up over the years (PCN... nematodes issues), and some fields may be a little bit heavy soil. They may not be free-draining enough. And so we'll say let's switch to growing some main crop Desiree, bigger stuff on there, or Rooster or whatever. So we look at the fields we've got to come round in the rotation, and we'll select the best ones. I mean we generally have most of them. But if there's a field that's not suitable we'll either drop it out or do something else with it, with maincrop potatoes.

Int: And if you needed to diversify out of potatoes, what other high value crops would there be as an option that you could grow.

N: I rent out again, carrots, and again, I rent that out, so like I was saying about the onions, I could grow carrots in a way, and I nearly did once, but what we do with carrots, Chantenay carrots, they

are like the salad potatoes, the little short ones, they are the equivalent of a salad potato in the carrot world. I rent out a couple of fields a year to a carrot grower and they are really quite useful in that if I did want to give a break crop to a potato field then I could look at an option of slotting carrots in that field instead, and I've still got the infrastructure there to use it, and I'm still making use of that water, to a similar level, to a similar financial level. I mean we grow potatoes as first choice, if it's suitable we'll grow carrots as another choice, parsnips, onions. But it has to slot in with the rotation, you know if it had had parsnips and carrots two or three years previously I wouldn't then be able to go back in with carrots, so we just have to look at the big picture.

Int: Would you say that the proportion of the business income coming from irrigated crops is increasing over time, or staying the same or decreasing?

N: Proportion I would say it's going up, but then when we were a small 300 acre farm, thirty years ago, it was still a high proportion. The potato market goes up and down, so one year it can be different to the next. Erm, proportion... I would say it's gone up over... I would say it's gone up. I would say it's gone up over the last thirty years.

Int: And what water sources have you got?

N: I've got some groundwater, I've got some surface water, so I've got both. I have winter licenses and I have some summer licenses.

Int: And are those licenses time limited licenses or?

N: Yes.

Int: And do you know when they are up for renewal.

N: They are various. The winter licenses, because winter licenses were over a longer term, because if we were going to build a reservoir we didn't want to run out in six years, and summer licenses are on a 6 year rotation and I did a few of them end of last year and I'm not sure when the other ones are but I'll keep an eye on them.

Int: And were they renewed to the amount that you wanted them to be?

N: Yeah, one of them was dropped a little bit. It was a groundwater license, and it was quite a high one, on a license that historically we hadn't used all of. It was just the way it was allocated when it

originally. Well, it was split up and then reallocated. So that was reduced, but I had plenty of headroom with that, so I didn't make a fuss. And yeah, the daily rate, I believe, has still stayed the same, it's just the total rate... I wouldn't have been able to shift the total rate to be honest.

Int: Can you, thinking about that, comment a bit on the use it or lose it approach that is being employed by the EA?

N: Hmm. Yeah, yeah, it's funny because it comes into our thinking of what water we should use. As I say, I've got summer licenses and I've got winter reservoirs, and some of the water is usable from both those sources, so I could pump from the summer license if I wanted to, and then the winter if I wanted to. Now, because I'm conscious I've got to keep that license... I can't let it go dormant for a period of time, I'm more inclined to start using the summer license of a year, so, well, let's get some ticked off the summer license, and then bring the reservoir in, when either it gets stopped, or I'm satisfied I've got enough in the reservoir or things like that. So I would think about it that way round. And I did have a situation where a couple of years ago I was irrigating a field from the reservoir, and I was pumping it quite a long distance to irrigate a field just down here actually, when I could have easily used the summer license. Now I wanted to use the reservoir because we had enough water in there and you know, I don't like using the summer licenses, unless I need to, morally. But I was told by the director, well, I wonder if you should use that, because of the fact that we want to tick some off the license. Which is understandable. But morally I didn't want to do that. However, if that year was used as a reference year in the future as to what the license should be, then I would have made a mistake. You know, I would be worse off because of that. So that's always something we just have to balance up.

Int: But do you think there's an alternative to that approach being employed by the EA?

N: I don't know how they could sort of, I don't know really. Because I don't know how they would allocate... sort of how justified the licenses were. Erm. Yeah.

Int: Okay, so thinking now about, I know that you've been involved in voluntary restrictions in the past... Firstly, so you are in a water abstractor's group?

N: Yeah, loose group.

Int: When everyone agrees a voluntary restriction do you all agree to restrict your water use by the same amount.

N: Well, the voluntary restriction at the time, it wasn't done within the water abstractor group. It was done by... the Environment Agency I believe was the leading communicator on that and they



sent letters out to the license holders in that catchment area, so it wasn't something that was done by the water abstractor group. I don't feel I have the jurisdiction to tell people about that. The only thing with the water abstractor group, the way it serves its purpose at the moment, is for me just to communicate with other people information that I have by going to meetings with the NFU and [REDACTED] in Newmarket, where there are people from other parts of [REDACTED] in general discussing the various water elements and things. And I try and communicate that back further down the pyramid to abstractors that, erm, you know, don't go to meetings... which is most of them. You know, so, well it's all of them, really.

Int: What determines whether people will have those links into the communication, you know why do you go to the meetings when other people don't?

N: I feel I've got a big proportion, well no, a significant amount of licenses in the catchment in this area, so the water availability is important to the farm business, so I feel I need to keep a steer on that. I feel morally that it's a good thing, you know, somebody has to advise the [REDACTED] what they should be thinking, there was a gap in the [REDACTED] knowledge database of my area, so I thought, well, somebody has to do it. And I was probably best placed to do that, because of where I am, not because of who I am. So that's why I did it. Yeah.

Int: And with the voluntary restriction in your experience has it ever gone beyond just eating into headroom?

N: Yeah.

Int: So it has actually affected your output?

N: Yeah, very much. I can't remember the year, but we had a situation where a potato field just died off.

Int: And do you feel that that was evenly shared between all of the catchment users?

N: Erm, as in "do I think that everybody took responsibility"

Int: Well, everyone agreed to restrict their water use... do you think that it had the same impact on everyone? Did everyone agree to restrict by the same amount firstly, or the same proportion?

N: Well, I assume everybody did. I don't know. I'm pretty sure they did, I'm pretty sure nobody was like well, "sod them, I'm doing what I want". I get the feeling that was the case. There may have been a bit of flexibility, you know if they had an eighteen hour run and were restricted on 12 hours they may have said, "well, let's do it and not run it the next day". You know, but I would hope to think that people morally were doing the right thing, or certainly trying to.

Int: So I haven't asked you about your main water risks that you are concerned about?

N: Well, water-logging isn't generally a problem here. I mean we get wet periods and we just have to wait, it makes things difficult, but it's, you know, there might be a field we've struggled to harvest, but we've got it eventually. Water shortages is the issue, and that's summer and winter, it's water availability.

Int: So, you have reservoirs available, but how many, for example if you had a dry winter followed by a dry summer, you could get through that okay, based on your reservoir capacity?

N: I would say we'd be... Yes. Things would be tightened up. I would, irrigation use is first and foremost on the potatoes, that's the crop that it is used for. Parsnips benefit from it quite markedly in yield and quality, but if I didn't give them irrigation I would probably, my crop would be compromised but it wouldn't be written off. To a similar degree to carrots, although they are a bit more susceptible at certain times. And onions would, hmm, would struggle, but again, they would need irrigation but their yield would be... it's more about their yield. There'd still be something there to sell. The problem with potatoes is, I wouldn't be able to sell them, or significantly I'd have more difficulty selling them and potentially I'd lose contracts the following year if I let everyone down. So that's the sort of hierarchy. So if I had only half the amount of water to deal with come the Spring on the lead up to irrigation, what I wouldn't irrigate is cereals (because sometimes we do that). I would say no irrigation on cereals, let's just focus on the potatoes, let's not overdo them and let's be tight with our water, but let's make sure we get through the scab period of potatoes, so that I've got good quality. I'd have to think very hard before I'd irrigate parsnips, but if I had some water I might... and the potato crop was getting finished, then I might do that, and if I had to stop irrigating potatoes right at the end, I would lose quite a lot of yield, but I would still have a tonnage there that I would have to weigh up if I'd got enough to get through my contract tonnage...

Int: Okay, now imagine it's two years in a row, what happens then?

N: We would have to seriously look at the amount of potatoes and other crops that we would decide to grow.

Int: And business-wise do you keep any kind of financial float to cover you to get through, or I mean, where's the insurance policy in your business against these potential risks?

N: Well, the insurance policy is having a reservoir big enough to withstand that, and we've got enough to withstand a dry winter and a dry summer, I feel, it's the following winter that would be an issue. And we had that about 5 years ago. We still had enough water supply, I was confident in the water supply that we had. We may have cut a field or two out but probably cut it out for other reasons as well as the fact that the water was less reliable at that point. But I know of other farms that really did significantly reduce their potato area because of it... it was because of that reason mainly but there were probably other reasons in there as well.

Int: And do you think that's something that farms will be needing to do in the future, increase reservoir capacity further to deal with potential longer dry spells.

N: Yes. Yes, I think it's an expensive answer to dealing with water shortages, but the basic principle of taking water when it's plentiful, which happens, and then storing it and using it when it's not plentiful, is a method that will be... it's the method that will solve the problem.

Int: It sounds like then that the costs of doing that is borne mostly by the producers, this is something that benefits everybody throughout the supply chain...

N: Well, the fact that we have reliability of produce to sell has gained value to the produce that we sell, and the contracts that come in the following years, you know the people that we are dealing with have been dealing with us for years and years generally. Some come, some go, but I do believe what's made us reasonably successful is the fact that we've been able to reliably produce the product that they want year in year out.

Int: And given predictions of climate change, we are going to have more extreme events, whether extreme heavy rainfall or dry periods, given that this isn't being caused purely by agriculture, but by everybody in society, do you think that it's fair that... how do you think the costs of preparing for that should be distributed? Because it sounds like at the moment, farm businesses have to draw on their own resources to make that big investment to have that security to ensure reliability of supply.

N: Yeah, it's a good point. I mean I've seen it as something that we take responsibility for, and it's our choices and it's our risk. There are grants out there that help with building reservoirs at certain times... sometimes there are, sometimes there aren't, but we've never used those actually, because you know it's, there are too many hoops to jump through, we've found. And the last reservoir we built, we wanted it to be done quite quickly and if we was to apply for a grant, it would have slowed the whole job up. Well, we got it built a year before we would have done with a grant, and so we had a year's worth of irrigable crops from that block of 300 acres, or 500 acres. So we just got on and did it. And like I say, we are fortunate, we get a decent value for our produce because we've grown it correctly, and it's worth a decent value to our customers, so they pay decent money for it. And so it's... so we've built up enough money to invest in such infrastructure.

Int: So just speaking quickly about the types of irrigation application methods that you use at the minute, can you tell me a bit about those...

N: Yeah, we are all reel-gun applied. We've got no trickle. I tried trickle, er, it's too awkward. But we had a go with that. A neighbour of mine uses it and gets on alright with it I think, but I tried that about 20 years ago and I won't try again, I've had a go. Well, we, I rent some land out to someone who has an irrigation license actually locally himself, and he irrigates our potatoes for us, and he uses a boom irrigator, and a couple of people do actually, but we ourselves are all... we've got about 21 rain guns.

Int: And is that more practical to use guns than booms when you are renting? Is it more mobile?

N: Yeah, it's just it's more practical for labour to use. I've looked into booms a little bit. They are a bit more efficient, perhaps in some ways, than guns. Fashions come and go a little bit, there was a bit of a push for booms ten years ago, um...

Int: Coming from?

N: Just advice about the best way to apply...

Int: From AHDB or?

N: No, where was this coming from. Maybe sort of inclinations from UKIA. They weren't telling us to use them, they were just highlighting advantages of different methods, and they never said, "You should do this, you should do this". But they'd say, consider using a boom, if you have situations where it's suitable to use a boom. To be fair that's how they would go about doing it. I would need, to be honest I would need more labour to move booms around. But my neighbours that use a boom, there's a couple of them, and they've only got one irrigator to look after. I've got 21. And you know it's a tough job to get people to do. I used to do a lot of irrigation myself, but I've stepped away from that as I've had to do more managing. And having suitably skilled people to do irrigation to the same sort of level to attention to detail is something, you know, you can't just get anybody to do it. And so it's been easier to apply with gun. And I make sure that we apply it well, with a gun.

Int: And what about your scheduling methods?

N: So I used to use Happy Irrigator, which is a computer-based spreadsheet where you enter the weather and it says how many mm per day you use. I used that for several years, five years or so, and it was quite good. Although I can sort of do those sums in my head now, so the last few years I haven't bothered to subscribe to it because I know that if it's a sunny breezy day, I'll use 5 mm today, and if it's a dull day yesterday, you'll use two. So I sort of use those principles but without having an actual figure for each field, I work that out. I've got more and more probes. I forget the name, they are not neutron probes, they are little sort of weather station probe things. They've got a rain gauge on and they measure the soil moisture at various levels within the soil. So I've got all that information coming through on selected fields for growth stage and for soil type and for area. So I can just get a bit of a picture from half a dozen of those as to what the soil is doing. And then we go around poking around with a spade. And I give all of my guys on irrigators a little trowel and I say, "keep poking around and get a feel". With the information, what we get a picture for from what the probes say and what the spreadsheet in my mind says, you get some experience for knowing what the soil feels like, literally, at those sorts of soil moisture levels. And you can say, well, yeah that'll take 15mm now, by just literally poking around with a little trowel in there, so we do that.

Int: And can you see a time where maybe the reliance on technology becomes greater and there are less people poking around with a trowel, or do you think that's just never going to change?

N: I think you should always have the sort of hands on the floor approach of actually looking physically at where you are applying that water. So I would always encourage the guys to try and learn, and myself. Like I say I spend less time now physically moving irrigators, running around like a headless chicken trying to keep them all going and juggling them all, like spinning plates. I spend less time doing that. I've tried to educate some of my labour force to do that and I will go around poking around just a bit of trouble shooting, you know, you've missed that bit there, don't miss that next time. Maybe you should up this rate to 20 mm instead of 15. So I've done a bit more of that.

Int: So it sounds like farm managers have to be very, very skilled, you have to know a lot about irrigation, and you have to juggle the competing demands of these different fields, you have to understand what the probes are telling you. You've got to the point where you are almost like the central processing unit, because you don't even use the scheduling service anymore, you have become the scheduling service!

N: Yeah, to some degree.

Int: So what happens when you can't work? Are you able to take sick days?

N: No I do, recently I've moved my annual holiday from February half term, this week, to May, Easter holidays. And before I go, and I've done this the last two or three years, and it's worked out alright. Because I couldn't go in the past, because physically somebody needed to move the irrigators and that was generally me. But now I can put, so I do more planning now. I was trying to work on some

of this morning, but I got distracted with other stuff, but I will work out where the irrigators need to be, the length of the fields, for the suitable length of the irrigator. We will spend time, this time of year, mapping out each field, "right we'll have four irrigators on that, we'll have a headland run this end, we'll have a wide headland there, and this, that and the other. I will work out how long each irrigator will need to cover a field. Like I say, hopefully it's about four or five days. Those plans will be in place before I go on holiday. They are usually done about now. Then in May I would have a list of fields where I would say, "Look, this is your lightest field, and this is your least risky heavier field", and I would say to other people that will cover for me, assistant manager, say, "Keep a close eye on this field, and this one look at it, but it will be very similar to these fields, so that's your reference point". And with the systems and the probes I can be in [REDACTED] with my family in [REDACTED], visiting them and I can see what the probe is doing, and I can see what rain there's been, and I can say, "Is anybody going to start that field soon?". You know I can just send a WhatsApp message. So I can do that to some degree and the guys know what they need to do, and my uncle was doing it before me, and he's going to be around to just keep everything rolling. So yeah, that's possible to do.

Int: So, what do you understand the term irrigation efficiency to mean?

N: Applying it in such a way that the water is made use of by the crop, um as much as possible, that's what I could call it.

Int: And that presumably is a goal for your management?

N: Yeah, but there is a risk involved. I could apply a bit too much for example, but the risk of under applying is large. So...

Int: So you'll err on the side of applying a little bit too much rather than a little bit too little?

N: Well, I wouldn't say too much, I would say, yeah, it would be made use of, I wouldn't apply... When I say too much I don't want you to go away thinking that I would apply twice as much just in case, but, you know if I'm trying to get the water deficit down from 25 to single figure, so it's at 20, I'm trying to get it down to 5, then I would apply 15 mm. If it's a bit of a sunny, windy day, I would put 20 on. I'm still not going into negative deficit, which is impossible, but, so there'd be room there. But I would rather put on 20 than er put on 15, 5 evaporates, and then we are ten, and then I'm not... You know, it's going to be too dry before I get back to it, and things like that. So that's what I mean by applying a bit more.

Int: And do you think the efficiency of your irrigation applications has increased over time, or is it kind of staying the same?

N: Yeah, no, in the last 20 years it has increased because we've all just learnt, everybody's learnt more about it, by various workshops, from the UKIA, or we've done some workshops with the abstractor group actually, and the wider, I say, not just the abstractor group, it was the catchment, oh I don't know the official name for it, but it was the catchment approach with Anglian water and everyone else involved with it. And the NFU, and a few abstractors such as me, so that's another reason why the abstractor group hasn't taken that much responsibility, because we've had this other group working on things as well.

Int: And where do you think the future is? What would be the next step for further increasing irrigation efficiency on a farm like yours?

N: Erm, I don't know. If I knew that I'd be doing it already. There may be a little bit more, we might have to start protecting against runoff down the ridge and things like that. But we sort of do that anyway. I don't do anything I feel causes a massive problem.

Int: And things like for example drone technology or satellite imagery, is that something you might consider using?

N: Well, it's funny, my agronomist has got a drone he plays with, and he sent it up over a potato field, he's my potato agronomist, and we spotted some stripes, which I believe was caused by the irrigator. So that then led us to insist on moving the irrigation run within the field, so we move it up a tramline and we come back, rather than just saying the irrigator goes there, and then come back 5 days later, the irrigator goes the same place. I mean it covers it all and it was reaching nicely, but I think it was overlapping. And causing some colour difference. It looked like it was matched up to that. So that caused me to say to the guy that was looking after the irrigation onto that field, "Okay, let's move it out of the irrigation runs (which causes him a problem, physically with moving taps and everything else). But I said, "look at this picture, you can see why it's justified".

Int: And what about something like waste water re-use. Is that something that you think might be possible?

N: Er, that's going to be very tricky with protocols and the threat of contamination on a crop. And to be honest, the wastewater, like roof runoff and things like that, it would only be a drop in the ocean.

Int: I was thinking more about directly using wastewater from sewage treatment plants.

N: I think our protocols would just be completely freaked out by that, and I can't risk a customer turning up to me and saying, "Oh, you put wastewater on that? Therefore we can't buy it". So that's the issue. If they were satisfied with it, I would still be very nervous of it.

Int: So, looking at the system as a whole, very quickly...

N: No, it's fine.

Int: I think we've covered quite a lot of what I wanted to talk about, I just wanted to talk a little bit about the broader fruit and veg system. Is there anywhere that you think the system is particularly lacking in flexibility?

N: My irrigation system?

Int: No, I meant thinking about the whole F&V supply chain, from your perspective, so farmers, packers, retailers, consumers. Where is it more exposed to water risks and is there anywhere where you think it's not very good at adapting?

N: Well, I feel it's our responsibility to look after our water supply. If we don't do that properly, then we won't be able to sell the same high quality produce, or the same amount of produce (whatever), to our customers. So that's why it's in my interests to do that. As far as future supply chain goes, I've had some interest actually from supply chain people to the abstractor group, but that was when there was a massive water shortage. Everybody's interested in what I've got to say or what the water supply is going to be like in the next couple of months, when there's a water shortage. I won't, you know, I don't tend to put much out when there's loads of water around. I don't want to badger people with information that they are not worried about, when there's a plentiful supply of water, such as there is now. I did put a graph out showing, to the abstractor group, showing the water levels in the [REDACTED], because there was some people being restricted in early December and November with their winter licenses. So I did say, "This is where the graph is, see how it's reacted to the rain we had last week and then come straight back down again". So I've had some of that but nobody's... well, we haven't met up and we don't tend to do that, but the only time we have met up was because there was water shortages and I had some supply chain people come along to those meetings. Just to get a feeling for, you know, "are you guys going to be alright".

Int: So in what ways do your customers impact on your water use? It sounds like when there's a crisis they are interested to know whether there will be security of supply, but the rest of the time are they doing anything to try to encourage people to change their approach, or to control the environmental water impacts of agricultural water use, or are they not really too bothered, are they just quite keen to have the produce at the right time and quality?

N: The produce, yeah. Erm, yeah I think that's right. I think they're... I don't get too much involvement from supermarket chains. They have done that, I think a few years ago there was some



people come from... No, sorry, I'm getting confused... When I had water group meeting there was a shortage and there was talk of buying water shares and sharing it all out. There was concern that a supermarket chain, for example, could buy all the water, and out-price farmers for it, things like that. For their own use, for their own produce.

Int: Where did that... was there a situation that caused that concern to arise?

N: No, it's just that people were concerned. That's the way supermarkets think about things. It wasn't myself, I just remember, because there was some talk of Tesco's coming in and having some involvement in discussions on how water is.... there's a new licensing regime which hasn't really happened yet. And the thought was, "Oh no."... The farmers in the room said, " Oh no, we don't want them involved. We'll sell produce to them and we'll look after... And like I say, I think the farmers want to talk responsibility for their own water, and take responsibility for that so they have their... And then choose what to do with it.

Int: So thinking about who you compete with in the market place, is it other UK growers in other areas, or is it overseas producers? Who do you see as your main competitors?

N: With potatoes it's UK stuff.

Int: And thinking about agricultural water use within the F&V system more widely, because potatoes are a very UK crop, but obviously there's much worse water implications associated with other locations, such as Spain. Do you think consumers are interested in that side of their food production?

N: Err, I don't really know. I can't say I know really. I wouldn't have thought it would have a massive bearing on what produce they bought, if they were given the choice. I wouldn't say it would have a massive bearing. And I think consumers always look like they would like to buy British, given the choice, and there's no price difference. I don't know to what degree the price difference has a factor in it. But within that choice, I don't think they are making choices based on water use. I don't think that will come into their thinking. I can't see somebody thinking, I'm not going to buy from Spain because they are short of water out there at the moment. Even with the stuff happening out in South Africa, you know, it's on the news about them being short of water, I don't imagine that would stop people buying South African. If South Africa apples doubled in price because they couldn't produce enough because of the water, then it would have an effect. But that's price causing that because of the water shortage. I don't think consumers will change their buying because of...

Int: So they are going to be kind of reactive as a result, but they are not going to be trying to use their consumption habits to influence the food system to develop in a more water secure way?

N: I wouldn't have thought so.

Int: So do you see anyone within the supply chain as taking responsibility for that, trying to increase the sustainability of the supply.

N: Yeah, but you know there are other sustainability issues which they will have under one umbrella of sustainability, air miles, food miles, whatever, you know. So that's what they are looking... you know, carbon footprints. I don't think they'll focus down on various sections of that, including water. You know, you've got Fairtrade stuff as well you see, if you get too many different things, Fairtrade, water, water responsible, whatever you'd want to call it. I think there'd be too much information on there. People wouldn't have the time to make the choice based on that, in my opinion.

Int: So all of that information needs to be brought together... If... I mean, do you see it as being for consumers to choose beyond price? As in should that information be packaged in some way that consumers can digest, but should it be consumer choice that's driving resilience in the food system, or does somebody else need to have oversight for that?

N: As I say, I think, I mean there could be government influence on there, because as I say, I don't believe, I'm not trying to talk them down, but I don't believe the retailers would do that. Because they are, at the end of the day they are generally price-based, and they have moral obligations which will influence them, but I think it's down to the producer to be as efficient if you like, or water responsible, as possible, and governments can aid the producer to be more responsible in legislation and grants if you want, to do that sort of thing. And then the retailer will then make choices based on the result of that long term thinking and those processes, to then make choices about where they buy their stuff from. I think it's getting down too niche to have packaging that suggests that it will be more water efficient here than there, between two different locations. Er, protocols, Red Tractor and things like that, will always push us towards being more responsible, and there's enough of them as it is, you know that's... I accept they're a part of growing crops, I'm not complaining about them. But we don't need more restraints. I think the market will determine whether I have to decide to build another reservoir or not, for example. That's what the basis has been down to, and what we can work within. You know, if the EA say look there's a threat, we're going to have to reduce these groundwater licenses, then I'll have to react to that. But it will be me reacting to that, really, not my customer.

Int: And one last question about how power is distributed throughout the supply chain... Who do you think has the most power?

N: Over the water?

Int: I guess over things that relate to water... So who ultimately is driving...?

N: Yeah, that's down to the Government organisations and the Environment Agency. The EA, they are the people who do the legislation for the license, the license conditions, the amount that we all have. There's certain sort of rights to that that we've got which means they can't just switch it off. But ultimately they dish out the water how they see fit between us, industry, public water supply and the environment and then we use it how best... you know, and if we are short of water and we want to get hold of some more we come up with ways of doing that, generally now it's winter licenses of high flow licenses.

Int: And do you think that, I mean, the Environment Agency control and determine a lot about how much water is used for agriculture in the UK, but they presumably have no influence whatsoever on how much water is used in the food that we get from elsewhere.

N: No, they don't have an effect on that, they just make sure things are balanced in such a way that things don't go wrong.

Int: And consumers are driven by price as we've just said predominantly, so in terms of thinking about the global fruit and veg supply chain that the UK is reliant on... who has the power to make the water choices more resilient in that, I mean thinking for example about recent droughts in California, actually the amount of water used for export didn't go down, agricultural exports from California made more money during the recent drought because they were pumping a lot of groundwater in order to sustain it, but that groundwater is going to take a long time to be replenished, it's...

N: So in that instance, their equivalent of the environment agency would have allowed that to happen.

Int: So we just have to put faith in governments in other countries to take care of the environmental issues in those areas?

N: Yeah, because ultimately they are responsible for their own country aren't they. Some big companies are getting involved... I think Coca cola seem to sponsoring various events and seem to be looking into trying to work with Anglian water about having responsible abstraction, and that filters down to us. But that's more environmental based, they want to be seen as, and quite rightly, as being responsible for their society that they are, um, their customers. And they are a global business, so perhaps they could look to put pressure on government to... Maybe they would highlight issues to the equivalent of the Californian EA to say, you know, "we are not completely happy with this, and this is what Europe are doing, or somewhere else in the world, and we feel that there should be stuff in place to help the long term water sustainability". So perhaps multi-national

businesses can have some influence on that, but I think they can only suggest things, I imagine. They are not going to turn around and say, "Well we are not going to sell you any coca cola then". But they could at least advise, and I do feel they have a moral obligation to do that, and that's what they are looking to do.

Int: It's a bit of a wide question.

N: Yeah, I've never thought of that. I've never thought of sort of an international common thinking. And I didn't know the fact about California and how they dealt with it, I assumed they all just stopped.

Int: A paper I read showed that agricultural production for export was given priority because of the economic importance of it.

N: And that's down to individual countries, and people within those countries to make a choice, now if people saw massive deterioration in the environmental wildlife and things in that area, then they would have a right to say, "we want this to stop happening". And if the government didn't stop it from happening, they would vote for the government that did say they were going to do something about it. So it's the people, effectively, who vote for regional government, or whatever, who ultimately have the ways of affecting that.

Int: But they most likely respond to crises, so the damage gets done first.

N: Yeah. No, and I say that, but then on the other hand, if legislation was brought in so that in California they couldn't do that, and food prices doubled, then overnight that government would get kicked out, that would happen within a month, you know if it doubled the food price and everyone said, "we are not having this, we don't want to spend as much money on food, and we don't want to run out of food"... There'd be food riots or whatever, and that brings governments down overnight. So they would have to, and that's what governments do, they balance it all up.

Int: That was really good, thank you very much for talking to me. Would you like me to give you a copy of the interview transcript?

N: If you've got a copy anyway, just in case, we are coming up to a busy time of year, but if it's not trouble I'll try and have a look at it. If there was a fundamental issue in that I've said the wrong phrase or you've written it down wrong, then I ought to spot that out. If there's a gap in what I've said give me a call.