INTERVIEW TRANSCRIPT

INTERVIEWERS: Ian Holman, Jerry Knox and Dolores Rey (Cranfield University)

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FARM LOCATION (NUTS3): UKH14 (Suffolk)

(First questions are based on the online survey we sent to UKIA members in December 2014)

Interviewers (I)

Grower (G)

I: What proportion of the farm could be irrigated?

G: 100%

I: Proportion irrigated in 2014?

G: 50%. This will be a typical figure. Although the potential is 100%, due to crop rotations and other things, normally 50% of the land area will be irrigated.

I: Which crops do you grow and their average yield?

G: Potatoes (earlies and maincrop) irrigated, vegetables irrigated, cereals rainfed, sugar beet rainfed and irrigated. Grass rainfed, no forage.

Maincrop 55 t/ha, earlies 45 t/ha, vegetables (pasnips and onions) 50 t/ha, cereals 7.5 t/ha, sugar beet 65 t/ha rainfed, 70 t/ha. This is due to a soil type issue, rainfed is grown in a more drought-resilient soil so yields tend to be higher. Sugar beet irrigated – we shouldn't be irrigating it at all - is there because of the rotation, very lighter soils. Grass, I could not give a yield. It is only grazed during summer months.

I: From which water sources do you get the water for irrigation from?

G: 50% surface water, 50% ground water

I: What type of abstraction licence do you have?

G: We have winter and summer licences.

I: What irrigation methods do you use?

G: Hose reels with rain guns 50%, hose reels with booms 25% and linear moves 25%.

I: How do you decide when to irrigate and how much?

G: It is a combination of water balance and judgement, water balance supported by judgement. So it will be 90% water balance and 10% judgement. Or 85% - 15%.

I: What is the final destination of your products?

G: Maincrop and earlies potatoes for supermarkets; vegetables are processing, supermarkets and exports; cereals and sugar beet for processing.

I: Was your production affected by past drought episodes from 1976 to 2010-2012?

G: First of all, what is a drought? And what a drought episode? Let's try to put this in context. This presumably is a rainfall pattern that forces unusual irrigation behaviour is it?

I: Yes. A simplistic think of a drought as a significant period of below average rainfall which then either could affect your business directly through droughtiness on rainfed crops or could affect you because you run out of water, because your licence is not big enough or could be that the Agency (EA) imposes abstraction restrictions.

I: Then make you take trajectories that are atypical from your schedule or your planning.

G: I find this is a particularly interesting subject because we have found it very easy to be very superficial in how we talk about droughts and what drought means. And I remember somebody once said to me when I first came and farm in these very sandy soils in this part of East Anglia saying a drought is 3 weeks without rain. And actually that is not a bad statement.

In my farming career in this area, I have experienced situations which have caused quite a lot of difficulty but they have been within a year which was not regarded as a drought year. So for example, all I need is 6 weeks with very very low rainfall in May and June. And I am going to assume this is problem because I can keep up with the crops demand for water.

So you mentioned figures the other day about design parameters for irrigation systems. I usually work on 80% of what you might expect. So there is that kind of situation. So that is where you can very quickly run into a situation when the infrastructure can't keep up. And the next level of problem is when the water supply can't keep up. And I have experienced a number of times in summer groundwater situations when, in this part of the world, generally speaking, if you pump most groundwater sources for 3 weeks continuously at the licence rate the drawdown will be such that you start running into problems. So that is the next level of problem. Although I have got licence quantity and I am not exceeding my licence parameters, over the length of the season there is enough water in the aquifer per se. It is just that the right of this very spot where I am taking it from because I have drawdown the water more quickly than it can move in to replace it. So you get into that kind of short-term problem.

In terms of what we do about that, in the first level when we start overtaking the infrastructure, the first thing we do is: OK, where are the priorities? It is a simple priority thing. Which crops are more sensitive from an agronomic point of view? And

then almost by default or by definition that will translate into a problem, a financial implication as well. So usually the ones that are most agronomic sensitive, otherwise the most financial sensitive. That is not always followed, but generally speaking. So you have to do that kind of prioritizing, and wait until it rains.

If there is a drawdown problem with boreholes, then you have to stop. You just have to turn the pumps off and that is, in the short-term. In the longer term, you may look at your installation and say: OK, how can I organize my abstraction so then I can manage the pressure on the different abstraction points?

And I guess some of this conversation is going to lead to mitigation, isn't it? What we do about it?

I: When that starts to happen, do you think of it as a drought?

G: On this sort of soils the word drought is not always used that much because we have to manage water so actively anyway. The conditions doesn't have to change very much, so soil type and rainfall pattern and, even geographically, you don't have to move many miles away from here before the whole thing takes an slightly different perspective. In a way you are in the margin of being able to survive in rainfed situation. So you don't think of water stress in quite the same way. It almost the case of saying: well, I think it is a bit tight, I won't water that field this week, I will wait for 3 or 4 days and you probably won't notice the difference. On these soil types close to here, you can't cope with this stress here at all.

I: So you are sort of implicitly working close to a drought situation anyway. You think the soils and droughty and in 3 weeks you can be in difficulty so you got it in your mind.

G: I think yes. We will expect to be irrigating within these 3 weeks anyway. Is not such as if we think that in summer we don't have to irrigate for 3 weeks, we will have to be irrigating anyway.

So, this whole thing is about distribution of rainfall patterns, isn't it? If you look at the long-term averages in this locality, and if you say there is a rule of thumb, potato crop needs 600 mm of water to take it through the year (I think this rule of thumb is fair enough); annual rainfall is around here long-term average 650mm. So in very simplistic terms, you can say there is enough water landing on a particular square area to support the crops that we want to grow. The problem is the distribution of it. It doesn't arrive conveniently. Just to help thinking a little bit in terms of broad sustainability.

Broadly, from a sustainability point of view, there is enough rainfall arriving in this locality to support what we are doing. It is only when you start taking into account competing activities and legitimately competing activities. But of course we are not growing crops that require that level of water on every hectare every year. What we are doing is long term sustainable, is just how we manage rainfall patterns. So it is all about time scales and how you react and what you expect. If you have one occasion where you [overpar?] your infrastructure so you cannot getting on anyway and you run out of water because you drawdown the aquifer so there is physically

no water there. If that happens once, you put it down on experience. If this happens again you start thinking how long since it happens before? And then, it is risk management. At what point you are going to start seeing how I can … what I do to cover this point. And one of the rationale elements of what I did there was adding irrigation reservoirs, adding stored aboveground water to support summer abstraction. One of the reasons was to increase spot application, the spot abstraction rate. So the Agency (EA) will determine how many cubic meters per hour I could take out of the ground. I say that is not enough, but my two irrigation reservoirs allow me to double that. So, one of the things stored water can do is to mitigate short-term shortages by securing a minimum instantaneous abstraction capability. And then what you got that in place, you can start managing that situation. So if you have a choice, today I can either take the water from the groundwater source or I can take it from the reservoir. Which one shall I do? If you look in the situation when you feel there is a risk that you have drawdown the aquifer too much or maybe you start to see the pressure on the aquifer, I will use the capacity from the reservoir if indeed is there. It is all in degrees. When you are on the continuum? Because there is going to be a day when you are going to need all the water from the aquifer and all the water from the reservoir. So you still get into the [model?], but where do you fix the parameters? Because what is not in the game is being able to store sufficient water to cope with a growing season where the is zero rainfall because that is the absolute, isn't it?

I had a conversation with another grower about 4 years ago, before the 2010-2012 drought even started. And we were having a general conversation about irrigation, because his business is all about leafy salads and supermarkets contracts where non-supply is not an issue, it is not acceptable, he has to supply. So water is an issue for all these crops and he went to a programme to build a lot of storage reservoirs. And I said, how do you feel about that? And he said, I don't think we have ever needed our stored water. I sometimes look at it and think it is a waste of money. But he said it will come a year when I need it, and as far as I go I am gonna have it, because when that year comes, and I don't know when it will be, I will be thankful for the fact that we have been seating looking at all these reservoirs for all these years. And of course that year came in 2012. So his approach for risk management is completely different from mine here, which in turn is completely different from the guy in an arable farm. It is just worlds apart.

I: What do you remember about those drought periods in terms of level of impact?

G: 1976 I do remember as one of very high impact. I am old enough to remember that but I wasn't a farmer yet. 1988-1992, that was high impact of course because that run up to the formation of our Water Abstractors Group so that was pretty high. 1995-1997, did it tend dry again then?

I: 1995 is often called the hot dry summer…

G: Ok, let's put as high then. Even a normal year has some impact.

I: For the most important crops here, what was the yield reduction during the last drought?

G: I would say the yield reduction was marginal because we were able to manage the situation. And also targeted to the most important crops and protected them. So for example in this farm the impact would have been on some parsnips and some onions because whatever else happens the potatoes get it. And they are very sensitive and in the long term they will be the most rewarding.

In this business the parsnip crop is very important because we do have direct commitments right through the value chain so we do want to protect our ability to service that. But I suppose, of the crops that we are growing, parsnips is more resilient.

In one way or another, our attitude towards risk is slightly different from the potatoes. We fall of a cliff with potatoes in terms of quality and its yield. We were having this conversation the other day that when it comes to drought impacts first…it was what it has done to the yield. But I need to translate that into marketable yield. Because actually is quality that is impacted first, and quality has a strong influence on my ability to satisfy my customer. So very quickly I can go from a position of yield being unaffected to yield being zero for my target marketplace because I miss the quality specification. I may have a physical yield, but for my target marketplace I have nothing. So it is then, what marketplace am I able to go?

If it starts cracking and splitting, with high levels of scab, even processors will turn this down…

I: If there is no oversupply already

G: Of course. In some years there would be an oversupply in that particular marketplace

I: What about prices when there is a drought? Normally the prices tend to go up

G: They tend to go up. But I think I would say now prices volatility is not what it used to be. Price has retained the ability to fall in years of plenty, but the ability to rise in years of shortage is nothing like it was used to be. And I put that down to a well-organized supply chain and international trade.

I: Would you say it is less than 5% the increase in price? Could you give us a range? Maybe it depends on the crop?

G: I would say it is between 5 and 30% or something like that. Most of us are more and more trying to secure our businesses and our margins by forward pricing, either by an absolute price or by a formula based price. So one of our ways of managing risk in a wider sense is to try and manage price volatility. So through that process we are reducing the ability to benefit from price spike. Generally speaking, those lifts in value are there for some crops.

I: Do you split your expected output into trying to fix a separate proportion on the forward contracts and keep some of it for the open market?

G: Yes. It depends on the product range in the marketplace. But generally speaking, within this business we try to use the… of the business, and give yourself the opportunity to take advantage of a bit of uplift f it comes. But that is because of the way this business is constructed in the market is targeting. For example, there are in the potato world, businesses that are entirely processing focused. And the likelihood is that by far the great majority of their crop will be fixed price. There is probably a yield cap, so only the unusually going over that yield cap will go into some kind of free market price.

I: Talking about this, did you experience any contractual problems during a drought? Why was that, because of quality issues, not reaching the agreed production, …?

G: Yes. I think a number of things happen when things go wrong. And the same sort of things happens whichever goes wrong. In a drought year, looking at lower yield and poor quality, if that drought is a universal drought, then customers will tend to change their specifications to allow the product to go in. If there is a local drought, then you are dead, you are up against it. If you over-contracted, and that can happen although the best planning, then very often there are penalties for failing to supply the contracted volume. And some customers take a more flexible approach than others. So there is everything out there in terms of how people react.

I: Now, we are going to talk about abstraction restrictions during droughts. Could you tell me if you remember in past drought periods what kind of restrictions if any was applied to your business?

G: I cannot remember anything from 1976. But in 1992 there were mandatory restrictions, and that is what triggered voluntary restrictions.

I: Also voluntary?

G: Not in 1992 but in more recent events. So post 1992 we have seen a combination of voluntary and mandatory restrictions, and this depends on the sensitivity of the different water source. So, for example, on surface water we have two types of surface water licence: we have managed level surface water, and flow based surface water. So in rivers we have hands-off flows and section 57. And section 57 restrictions in surface water are coming very quickly. And the ability to use a voluntary approach in those situations is not well developed. I haven't come across examples of voluntary mechanisms to manage a low level situation in surface water. I have come across in manage water level situations. There have been dry years when there have been a voluntary code and it has usually being things like everybody agrees in irrigate at night for example. That reduces the number of hours of irrigation….

Groundwater is quite different and we have referred a number of times to 1990 and the formation of the Water Abstractors Group. That group still exists and it was formed in reaction to a mandatory ban on groundwater abstractions at a very

sensitive time of the year. It happened early August or something like that, it was peak growing time for potato crops. The EA, or National Rivers Authority at that time, did not engage with abstractors at all. They simply saw the aquifer level going down and decided that it was time to stop and just sent a letter out saying turn your pumps off. It was disastrous.

The WAG was formed to try to do something about it. And what it started doing, and has done from that day to this, is to engage with the EA and talk to them about what is happening in the aquifer and see if between us we can organize things so that abstractors do not face a total ban. And the way it manifested itself is in periods of groundwater stress abstractors have agreed to a voluntary restriction. The toughest one we had was 50% restriction, and the most relaxed one (well, the most relaxed one is zero, but when there was a restriction) is 20%. So between 20% and 50%. Over the years, I don't know how many times we went into voluntary ones, it is probably 4 or 5 times, and it was typically 20% reduction in applications.

I: What about the information sources that you normally use to be aware of drought? Radio, newspaper, Met Office,…?

G: Our own observations, EA and Met Office data. Our own daily observations or if it stops raining, our own observations just observing the flows in the rivers.

We are having a annual meeting of the WAG in about 4 weeks. So in early March we will be talking to them about the prospects for groundwater in our area. For example, in 2015 I am predicting the EA will come along and say: Look chaps, the recharge is going pretty well. We had average rainfall or better than average rainfall in these weeks. It is going to take an event that none of us can foresee to result in any kind of restrictions this year.

We are all bright enough to look at the numbers, have a conversation and say: OK, groundwater is gonna be safe this year. But the conversation in 2012 was rather different. In fact there were several conversations. That was a very tricky time. But interestingly we got through it, you know?

I: Do you think in that 2011-12 period it was because it was a winter drought that it wasn't on the radar until it was, you know, it got quite serious?

G: When you look at the figures, when you look at the rainfall curves and the aquifer level curves, looking back you think: Oh, come on, why on earth we didn't see this coming? But when you actually cover up you started you know, this is time going this way, and you cover that curve up. So what you can see is the actual to a particular point. So, what come on, if we cover that up, we cover that up, we cover that up…are we beating ourselves up a little bit here? Because you after ask you the question: What would have happened, how our view would change if we shifted from a below average rainfall to above average rainfall at any point? Just do it month by month. And if we shift it to average rainfall, average rainfall, average rainfall…we have been saying well actually, a little bit tight but.. finger crossed. And of course it didn't and didn't and didn't…so at what point you say: Oh shit! We seriously have to do something. And to that extent that is what curtailed us out. But

the other thing is ok, what should we have done about it? We couldn't foresee it so what should we have done about it that we didn't?

I: Now, we have here a list of strategies that could be applied when there is a drought. If you could tell me which ones do you normally apply and what are the most important ones, like the top 2 of strategies?

G: Make sure I am understanding this. So abstract to a maximum to get the water content up. Is that trying to build resilience in the soil itself?

I: If you think the EA might be going to impose some restrictions, in that run up to that, get as much water onto the soil to build it up before you know things might be cut back.

G: One of this is abstract to a maximum to get the soil water content up. There is an implication there, that I have some headroom in abstraction. And I gonna suggest that I've probably gone passed that point already. And also on these soils you buys you so little time…I can't think of soils where you may be happy to run a deficit down to 40 mm for example. In which case you might say OK, less get as close as soil capacity as we can, then at least I've got 40 mm in the bank. But it doesn't work like that around here because we are working to much tinier margins.

Irrigate a reduced area to the full potential…I think the next two go hand in hand. Irrigate a reduced area to full or full area reduced. Well, it depends a little bit on…well all depends…In potatoes, for example, I am gonna suggest it makes far more sense to irrigate reduced are to full potential, because you lose a lot. Other crops, like parsnips for example, I would say we would irrigate the whole area, but pull it back.

Irrigate at night…It depends on what we mean by that… Science tells us that the water will be more efficiently used, less evapotranspiration losses so it would be more effective if only applied at night. But there is an underlying presumption there, that I actually have the infrastructure, the capacity to do what I have to do in half the time. And I would suggest that certainly, in the farming systems that I have been involved, I have never had the luxury, the capacity of being able to say…So we are just up against it. So that is way down the list.

Renegotiate existing supply contracts. There are limited opportunities to do that. But I can think of one I was involved with. If you just want it for the story book…

Develop a drought management plan. I think when you get to that stage it is a little bit late.

Evaluate the water resource position. Bit late.

Personally negotiate with the EA. I wouldn't be doing that in a run up. Similarly work with WAG.

So the top 2…

I: If there is anything else that is not there, please feel free…

G: Is it relevant in this question that I would have already talked to the EA?

I: The question is when you are starting to recognize that there is trouble coming, that the EA is likely to be thinking about mandatory restrictions or bans, and this might be some of the actions that you would do, either to stay off from doing that, or to position yourself ready for when these restrictions are coming?

G: The top priority then is to work with local WAG and negotiate with EA. That is number one.

I: After the last drought episode that you were affected by, is there any changes in the farm management in order to cope with drought risk? You have here different options…any others?

G: I think the most relevant one is the development a drought management plan

I: I was going to ask you…does your business have one?

G: Not formally, we have an informal one. These are the sort of things we talk about…what happens if…? I think in this business we would now spend more time discussing things like headroom and water security than has been the case in this business before.

Within this business there has not been conscious decision that says: oh, because of the last drought the cropping has changed. If the cropping has changed is not because of drought. But what the business is doing is saying: OK, medium to long term there is an issue here…What are we doing? And it is things like getting involved in the regulatory reform process. So this sort of things, either to WAG, NFU, Defra, working Cranfield University, engaging in this kind of things…which is all helping to inform the business….Because this is the regulatory and cultural environment we are working in. So helping to shape that environment and use that knowledge to help developed our own drought…

I: All these activities are part of the business plan to understand the risks and the implications of droughts and water scarcity.

G: Yes, yes…This business doesn't feel that threatened in the short term. Or put in another way, it has headroom. But what it is saying is that this headroom is likely to disappear, one way or another. Either because we manage our farm more intensively so we are going to need that headroom. Or because weather patterns are changing and just the weather itself is going to take away the headroom. Or because the regulation process is going to take away the headroom. Probably is a combination of the three, isn't it? So we have to work out what we are going to do about that.

I: What is your opinion about the management aspects that could be change to improve drought management in the UK? Here you have a list of things…

G: My starting point is a much better understanding of the water environment and what this water environment is expected to deliver. So, by that I mean, if I at the

local level want to understand my catchment, how much water is in the catchment, and I want to know who are the legitimate users, and how much they need and why. And I think the big one on that is the environmental requirement. I am not making a value judgement on that at all. I just don't fully understand it. If I did fully understand it, then that is the key for me to fully understand the rest.

I have the sense, we know all about the precautionary principle. We know all about the protection being based on low flow…The big area for me that we don't understand is ecological resilience to stress. So we now seem to be lot in a process that avoids at all cost putting the ecology under pressure. And is that reasonable in the context of the UK economy and social and environmental ground? So I think there is evidence, but I would say the ecology can cope with this amount of stress. But we have to work out what level of stress this is. An also whether is defendable to say: Ok, there is this stress level that we could put under…let's define that, make it an objective process so we can then determine whether that releases more water to share among the other users, which is essentially public water supply, industry, leisure, agriculture, and any others…

I: Navigation.

G: Oh sorry, navigation. So we know what these categories are. And then agree some way of covering them up. And the starting point is for those other legitimate uses how they are covered up at the moment? It is natural justice that works here at the moment, or not…And section 57 plays an important part in that. Because that is the mechanism that says agriculture as a water user, let's put ecology to one side, but if you look at the other basket of water users, the thing that separates us from all the others is section 57. And there is a feeling within agriculture that, because of section 57, we are the safety valve.

That is the mechanism that protects everyone else and allows those systems to function. Drought, declaring a drought... or those sorts of processes. There is an underlying presumption that as industrial water user, because I can have this amount of water because my licence says I can have it, and there will be a long slow build up to me being told I can't have it any longer. Whereas with agriculture we face situations when potentially it is like that and we might or might not see it coming.

I: On a scale of 0 to 10, how do you think drought is important to your business?

G: 10…Is a hysterical reaction??

I: I guess in the context of other risks.

G: I am going to try to rationalize that. Of all the things that could go wrong which I have limited control, the one that worries me more is frost? Is hail?

I: What keeps you awake at night?

G: Yes, and I guess from time to time, is stop raining.

I: Do you think droughts and water scarcity are likely to become more frequent in the future in the UK?

G: Intuitively it is likely become a more frequent matter on two counts mainly. The demands that we are placing on the water resources are growing. So, forget about any change in weather patterns. There are more and more of us that want to live in this island. More of us want to jump in the swimming pool, more of us want to go sailing, more of us want to shower twice a day rather than once…there is a tendency for the need for water increase rather than decrease. And I don't want to go into much of a debate into climate change because I don't know. But the balance of probabilities, you look at the number of dry years, wet years, all that sort of things. And dry periods and very wet periods. It looks as if we are in a periods where these sort of things are more frequent. What I don't know is, when you see back through history you can see periods like this before. But I don't know if the trajectory is going that way or that way. The sort answer is yes.

I: Which options are more relevant to your business in terms of rich management?

G: First of all, modernization is a priority…? We can improve through modernization of equipment. We have on-farm reservoirs and quite a lot of our water is secured through that route. But it might be that we have to expand that. And certainly changing management practices. So I think it is a combination of these three.

I: You mentioned that you had an anecdote about renegotiating supply contracts during a drought event.

G: I think it was a reference to us negotiating water transfers. And I think that one was quite interesting at that time. I was working as a consultant and a strawberries grower rang me up. He was a trickle irrigator and, I can't remember why but he cannot trickle, because still these days there is no problem with it, no licence. And he was up against it. It was in 2012 and he said: I am really really desperate, what do I do? I need to get some water on the strawberries.

And we didn't talk about breaking the law, but I had a look at my list of abstractors for that water unit, and I found somebody who I fancied have a licence of right and wasn't using it. So I phoned him up, and said: Have you got this licence that you are not using? Yes I have and now I don't. And I said: are you interested in making a few […]?

And the answer to it was, because you cannot transfer a sleeping licence, we actually got the Agency to accept, but this guy was going to abstract his water and irrigate this field on his account, not in the strawberries grower account but in his account. And it has done in 48 hours. But the biggest time-consumed was me convincing the licence holders land agent that what we were doing was legitimate. And it was also about with the Agency. If 2012 demonstrated anything it was just what the EA could do if they were minded to do it.

I thought that was interested. When really pushed against it. And I fully pleased for our local agencies during that period. It something could be done, they will make

everything to make it possible and do it quickly. So under normal circumstances even that little variation should have taken a couple of months, because of formal applications…but it was over the telephone, two emails and a phone call.

I: Can I ask you a question about your appetite to risk. What is the businesses attitude to risk and where water fit into these risks? What are the big risks to agribusiness these days?

G: It is market failure I suppose. That should be the biggest one. Discounting what we are talking about, what the priorities are…

Because we are farmers, maybe a lot of producers of things have a similar kind of mind-set. You are focus on production. That is our focus. So we are talking about risks, my tendency is to think more in things like, if animals more like diseases, with crops in water renewal and this sort of things. So casually forget we live in a world where price can tumble. And as I mentioned earlier we don't get the equal or opposite spikes any more. So it is pretty tough.This company has migrated quite significantly over the last 10 years. 10 years ago the biggest consequence of drought was a nice lift up in price. So we had that, thanks very much, and we banked it. Because, generally speaking, one way or another, over a run of years, you are better off…

I: Because you have headroom…

G: We can't afford to do that anymore. We have to be much more meticulous at the production level, and achieve our yield and quality targets.

So in terms of attitude to risk to things like water, how do we quantify that? We accept significant element of risk. We are not talking risk averse. Risk averse in water will be pulling back up production to be sure that we have sufficient headroom to cope with the very worst of conditions. Commercially this is very difficult for us, we can't afford it. So we have to accept a higher level of risk that we feel comfortable with. But we then think about mitigation, this business has being accepting in some years we might have to sacrifice that field of potatoes. I don't have enough water for you, and hope it will rain.

So there is anything we can say about drought, especially in 2012 as difficult as it was, it actually started raining. But if you look every other drought, at some point, it just actually start raining. And the only reason why 2012 will not be remembered as the 1976 is because in 76 it didn't start raining until the end of August whereas in 2012 it started in June.

I: After the UKIA conference

G: I remember to sit in drought meetings in drought summits in London. But we didn't know that. It was incredibly serious at that time because we didn't know what was coming next.

I: How does that risk translate through the rest of the supply chain? Do you think that the growers, packagers, processers…, do they try to lead on that?

And each part of the supply chain thinks, we are OK, there is no risk because no one wants to…

G: Absolutely right. And all kind of things happen for all kind of reasons. And there are all kind of stories from 2012, which I think are pertinent to this kind of study. So there is the guy who looked at his situation and said: I am just not going to plant. I am reducing my area by whatever percentage point. And someone over the hill just did that, he was fairy public about it. He reduced his potato area quite significantly because he cannot run the risk of not being able to deliver.

I can think of another operator in the potato world, slightly different set of circumstances and a completely different attitude to risk. His view was: well, I will cut back my acres a little bit.. Well, if I don't plant I know I will not have any income. If I do plant, this is my state money, this is what I stand to lose, I am gonna take the chance. And of course the fact that it started to rain in June, he came out the winner.

Destabilizing customers is a very difficult one. I think it is actually more difficult that you imagine to hide information from customers these days. We all talk too much, they can see it. And I guarantee that when we were going in March 2012, do we plant or don't we? The number of conversations that were going on between packers and potato growers around the world to make sure that they do not run out of potatoes… That was happening.

And that is why we don't get the spike anymore, because the supply chains can respond. And it is much easier than it was. And most food supply chains they are incredible sophisticated these days. We are usually drawing from a number of points across the planet, of most things, at most times, for most years. You are doing business with Egypt, Spain... You just increase the magnitude of it.

I: Can I ask you a little bit more about section 57? We are particularly interested in this thing. We want to know what information the EA provide you when there is some restriction, if you know which are the triggers for section 57 being applied, if you have any ability to negotiate with the EA when restrictions are applied,…

G: Let's separate section 57 in surface water and groundwater. What I don't like about section 57 is that I think it is unfair for agriculture. But it exists.

So section 57 surface water, I think a lot of us we can live with it conceptually more easily that we can with groundwater because you see the river flow go done, and you accept that something is gonna happen. But that said, I think in a more science-based world, maybe we do accept the concept of ecological challenge, I do not know or understand the basis on which the EA says now, section 57 on surface water. But I guess I kind of accept it, you know, because the river is dry so maybe they have a point. But I think I should be challenged about that, because I don't know what the indicators are, what it is actually happening and how good that science is.

S57 as applied to groundwater is very complex and as I understand it, the logic says that S57 is all about the ecological standards in surface water. It is all to protect the ecology of surface water. What it is saying is, that EA thinks, that what is happening in groundwater is of sufficient magnitude that is going to affect the surface water associated with it. Therefore, S57 is going to be used to restrict abstraction of groundwater. And for me this is the fundamental flaw. Because I think we don't understand the water cycle well enough, and I don't think the EA does either. But they have to be seen to be doing something, and that is fine.

I can well imagine, for example, within a particular catchment, intuitively you will say that a S57 restriction on a borehole, on a groundwater source adjacent to a river where there is an established connectivity, that trigger should happen before this guy over here who is 5km away from the river source, what he is doing is not going to have an immediate impact on the river. That is what seems logical for me, but is it true? I don't know. I want somebody to convince me that it is true. If we are all going to be treated the same. Because that is the habit. If there is a threat of S57 on groundwater everyone is treated the same. And this is partly because there is no mechanism by which people can be treated as individuals, and this seems to be not fair.

So I think part of your question was if we can do anything, or if we can negotiate. There is no doubt with groundwater and S57 we can negotiate, or we can enter into a dialogue. I think it is semantics, it is a dialogue. We avoided S57 restrictions in 2012, it is a measure of the success of the dialogue. Or put it in another way, I believe dialogue has been a value, because we avoided S57 on groundwater in pretty sensitive areas in this part of England.

I: Can I ask you a question. Particularly on the groundwater, who will you having this dialogue with? And were they able to enter into that dialogue because they have the knowledge and experience of the local area? Because EA has lost a lot of the senior groundwater people, so there is some loss of collective feet on the ground knowledge.

G: You are kind of asking me to guess, which is always dangerous because I quite like guessing…A point of contact is a local licences officer. One of the things they are looking at is licence quantities and abstractions patterns. So in their dialogue with us, they are asking us questions as: we know what the abstraction pattern is in this area over a run of years. Do you think it is going to be different this year? How much is it going to be different? What impact is this going to have?

So I think we know, in this catchment, we only abstract 42% of our total licence quantity in agriculture. I cannot give figures for other sectors, but what this means is that agriculture has to change its habits quite a lot to have an impact on the calculations, bearing in mind that all calculations are based on licence quantity. So the risk calculation our local guys are going through is well…We are obliged to make a judgement of what theoretically could happen, but we are actually overlaying at what is more likely to happen. What is the gap between the two? How big is the risk we are taking? And my observation of the behaviour in 2012 compare

to other periods is the frequency of meetings went up. We were actually watching us week by week, both sides.

So your question was who are you talking to? I think we are physically talking to our local officers, but I suspect there are conversations going all the way up the chain. Because the EA wants to be seen as a responsible and competent licencing or regulatory body, and they want to be seen to be fair for all parties.

I: Do you feel like you were speaking to people that actually know and understand your area? Or you were talking to people following a rule book?

G: We are definitely talking to people who knew the stuff on the ground. From time to time we interface with the top people in the EA. People will sit across the table and say one thing, but then the decision is another…I felt through that process that we were talking to people that know and understand.

I: For the next drought that comes along, what do you think could be done better? Or what could be improved about the way that abstractions are managed during drought? What is your personal wish list?

G: Well, we can move up our position in the resilience scale. We have been talking about it, but the next step is doing. So, will we have done anything to protect us further? I don't know but I hope so. What lessons do we learn about observing the sings and doing anything about it? And if so, what? In terms of the dialogue and the way regulator behaved, that was hellishly positive actually. Giving the whole basket of things that were there, we couldn't expect much better.

I don't think there is a fundamental thing. But it would be interesting to see how some of the processes we are involved in will be delivered. What WFD does to make the risk more acute, which I think it has the potential to do. I don't know whether the abstraction reform will give us the tools to become more resilient. That is not known yet. I have mixed views about whether farming businesses should be (and I could make myself very unpopular in the farming sector) receiving grants to build reservoirs. I think those are commercial decisions. If there is a grant, I will take it but I am not sure… I feel happy about the tax break but is it a tax break a grant with another name? I don't know. The use of tax break is more a deferring mechanism rather than a gifting mechanism. So some kind of incentives…But I think that incentives should be driven by the general good.

Commercially, very few people can afford to invest in on-farm storage to protect themselves against an unknown event. And it could be that more and more it is driven out of production which would increase food imports. So commercially the market place says we can afford to irrigate in this country so we don't do it. Someone else may take the view that in the national interest this is unacceptable and if business can't fund that protection, then public purse has to fund it. And I think that is fair enough…