



A Report for Ireland's Nuffield Scholarship Trust 2014

- Title:** Thinking Different - Encouraging the Transfer of Knowledge in the Poultry Sector
- Scholar:** Alo Mohan
- Sponsor:** FBD Trust
- Date:** September 2014
- Countries Visited:** Canada, Australia, Belgium, Netherlands, UK
- Objective:** To investigate the opportunities and threats to the effective transfer of knowledge in the poultry sector.
- Findings:** The technologies and methodologies of the transfer of knowledge are well documented - the industry needs strong & effective leadership from farmers & other stakeholders to join up the dots. We must always think Different.



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A photograph showing a person's hands holding a small, fluffy white chick. The background is a blurred poultry house with overhead lights. The text "Thinking Different" is overlaid in the top left corner.

Thinking Different

Encouraging
The Transfer
Of Knowledge
In The Poultry
Sector

Disclaimer

This publication has been prepared in good faith. The opinions expressed in this report are my own and are not necessarily those of the Nuffield Farming Scholarships trust, or of my sponsor, or of any other sponsoring body. All pictures used have been sourced by myself Alo Mohan and permission granted for their use.

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On left Cecile Steel; On Right: Wilbur Steele (left), his wife, Cecile, and their children are shown at their Ocean View poultry farm in the 1920s.

1. Executive Summary

Remarkably today's billion dollar broiler industry only came about because of a mistake. It was created in 1923 when Cecile Steele a housewife in Ocean View on the Delmarva Peninsula, USA, took delivery of some chicks to raise for her family. The hatchery got the order wrong and instead of sending her 50 birds, delivered 500. Cecile decided to keep them, in a specially built shed which she had hastily constructed, and eighteen weeks later she sold the surviving 387 birds for the equivalent of \$12.50 each. Encouraged by her financial windfall she ordered 1000 birds the next year and her husband Wilmer gave up his job with the Coast Guard to help. By 1927 the couple was raising 25,000 birds and the modern broiler industry was born (Brown, 2007).

Today the industry has changed almost beyond recognition. The stakes are high and mistakes like the one that started our industry cannot be afforded. The objective of my study was to investigate the opportunities and threats to the effective transfer of knowledge in the poultry sector, to ensure that our industry is run to the very highest standards. As our industry gets older we must ensure that it gets WISER embracing the key principles of Welfare, Innovation, Sustainability and the Environment.

The technologies and methodologies of the transfer of knowledge are well documented - the industry needs strong & effective leadership from farmers & other stakeholders to join up the dots. We must learn from our mistakes and just like the founder of our industry Cecile Steele we should always be prepared to Think Different.

2. List of Tables & Figures:

1. An illustration of the digestive tract of a broiler;
2. The economic effect of poultry farming on Canada;
3. Fancom iFarming;
4. Rondeel Farm structure.



3. Personal Introduction

My name is Alo Mohan, originally from Clones, Co. Monaghan, but now living in Drumkeen in Co. Cavan, in the heartland of traditional Irish chicken farming country. I am married to Yvonne who works on the farm with me and together we have four children.

I am one of nine children, and my father, a former publican, turned to farming after the closure of the railway in Clones. He erected a purpose built poultry house containing 10,000 birds in 1960, an innovative move at a time in Cavan/Monaghan, an area which today contains over 50% of the poultry in the Republic of Ireland, including ducks and turkey.

I attended Enniskillen Agricultural College, and during my time there I represented the college as Norbrook Student of the Year. Three years later, I started a new poultry unit on a Greenfield site in Redhills, Co. Cavan. Today we produce over one-million birds a year, and the business is starting to expand again.

I served 10-years on the National Poultry Committee for the Irish Farmers Association, four of which was spent as National Chairperson. As the National Chairperson for Poultry I represented the industry on the national food board, Bord BIA, and as the Irish representative at European agriculture sector organization **Copa-Cogeca**, representing eggs and poultry in Europe. In 2012 when I applied for the Nuffield scholarship I was the National Chairman of

the IFA poultry. I applied for the Nuffield scholarship to investigate ways of developing the transfer of knowledge to the different stakeholders and also the affordability of putting in a platform for research and development for poultry farmers. For the reasons I have outlined above this research is very personal to me. I believe there is a gap in the transfer of the knowledge to all the different stakeholders from the Commission in Europe right down to local governments, industry, consumers and farmers alike.

4. Acknowledgments

I would like to thank Nuffield for giving me this opportunity. Nuffield scholars lead a very full life in their community and workplace, and this places a lot of challenges as well as opportunities. When travelling, it is your family and friends who take up the slack as you send back pictures of fun times in beautiful and exotic places around the world. To my wife Yvonne, who encouraged me to do the Nuffield scholarship even though she knew the responsibility of raise our four young children, manage our farm not to mention carry the strains of leading normal life, I thank you.

I would like to thank all the people who opened their doors and were so generous with their time and knowledge. This Nuffield journey afforded me to interview some of the best minds in the poultry and other industries in the world. FBD trust sponsorship allows farmers like me try and improve our industries with our reports and travels. I would also like to thank FBD in their patience, with me knocking on the doors looking for sponsorship for other events and generously responding.

To Wayne Redcliff who travelled with me around Australia, I have a true lifelong friend. I also thank my four young children for supporting me at their tender age.

Over my time doing the Nuffield scholarship I have had wonderful opportunities to meet people from all over the world, and also made many new lifelong friends.

As well as new baby daughter Lara, our fourth child. I also worked with in the community at many different aspects I was very fortunate to be awarded a community leadership award from my home town in Clones. Helping my home town football team get the first grounds and pitches after 128 years I was awarded the National John Sherlock award for services to football. Like this report will suggest I have tried to live out the commendations by helping set a taste event led by farmers, Taste of Cavan which attracts over 40,000 people. During this study we set of the Poultry Council of Ireland which has representatives from the poultry processor, egg packing stations, farmers/producers and veterinarians. The setting up of this poultry council owes thanks to Marian Harkin our MEP for this locality who set up meetings to bring all the different strands together. This allows the industry to speak with one voice. Nuffield Ireland and FBD trust I owe a great debt of thanks to them both for allowing me the

opportunity to make this report.



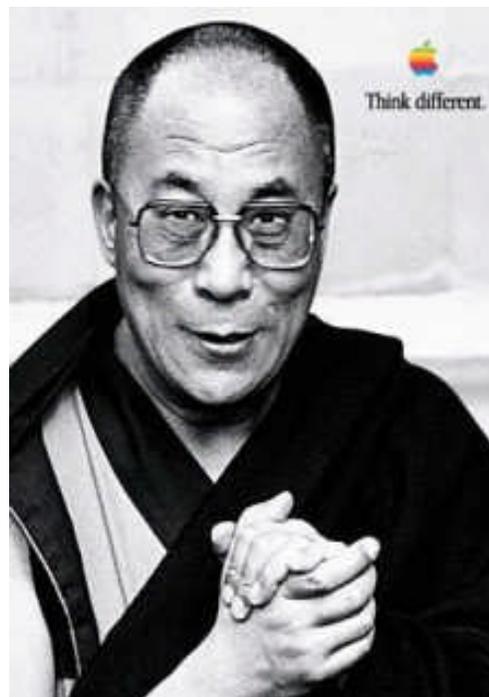
5. Thinking Different

In May 2013 I was privileged to play host on the farm to Jerry Manock. Jerry was Apple's original designer. He designed the original Mac, established the Apple design ethos and is named on the patent for the personal computer.

On one level the computer industry and chicken farming could not be further apart. Yet as Jerry pointed out to me they should be very similar. Both industries are creating products for consumers and as farmers we should be much more consumer led. Our industry has for many years been conducted behind closed doors as if we are ashamed of it, and Jerry pointed out the importance of engaging directly with our customers.

Apple's early ethos was epitomized by their slogan "Think Different". "Think Different" was an advertising slogan for Apple Inc. created by the Los Angeles office of advertising agency TBWA\Chiat\Day in 1997. It was used in a television commercial, several print advertisements, and a number of TV promos for Apple products and became famous because of the accompanying Crazy Ones text.

“Here’s to the crazy ones. The misfits. The rebels. The troublemakers. The round pegs in the square holes. The ones who see things differently. They’re not fond of rules. And they have no respect for the status quo. You can quote them, disagree with them, glorify or vilify them. But the only thing you can’t do is ignore them. Because they change things. They push the human race forward. And while some may see them as the crazy ones, we see genius. Because the people, who are crazy enough to think they can change the world, are the ones who do.” (Wilson, 2011)



Jerry also pointed me to a quote from Apple's founder Steve Jobs:

“When you grow up you tend to get told the world is the way it is and your life is just to live your life inside the world. Try not to bash into the walls too much. Try to have a nice family life, have fun, save a little money. That's a very limited life. Life can be much broader once you discover one simple fact, and that is - everything around you that you call life, was made up by people that were no smarter than you. And you can change it, you can influence it, you can build your own things that other people can use. The minute that you understand that you can poke life and actually something will, you know if you push in, something will pop out the other side, that you can change it, you can mold it. That's maybe the most important thing. It's to shake off this erroneous notion that life is there and you're just gonna live in it, versus embrace it, change it, improve it, make your mark upon it. I think that's very important and however you learn that, once you learn it, you'll want to change life and make it better, cause it's kind of messed up, in a lot of ways. Once you learn that, you'll never be the same again.”



Steve Jobs - One Last Thing. Pioneer Productions. PBS. November 2011.



Although she may not have recognized herself as such and even though many even in our industry have never heard of her, Cecile Steele was clearly one of Steve Jobs' "Crazy Ones". She broke the rules and thought differently. She kept those extra chicks and built a shed and rigged a heater and as a result inspired an industry that feeds the world.

As such she should be up there and arguably as well-known with consumers as the figures that featured in Apple's campaign.

Jerry's visit and Cecile's story got me thinking. As farmers we have a duty to improve things and not to accept them just as they are.

Let's keep thinking different and always strive to make things better.

For ourselves, for our animals, for our consumers and for our families.



6. Knowledge at Farm Level

Our industry is getting increasingly sophisticated. Whilst just as in Cecile's day we have chickens in sheds, the technology that supports those birds is increasingly sophisticated. We have complex heating, lighting and ventilation systems and the birds themselves have, through genetic innovation changed beyond recognition.

Over ten years after the EU Welfare Directive 2001 was introduced, there was still little knowledge of what it contained or what was required of farmers in Ireland. At the same time, in 2012, as the Directive was being placed into law in (Farm Animal Welfare Advisory Council, 2008), a report from the Food Safety Authority of Ireland emerged giving recommendations for a practical control program for *Campylobacter* in the Poultry Production and Slaughter chain (FSAI, 2011). However, the report was compiled without any input from the Irish poultry industry. So, by the time the *Campylobacter* league tables were announced at the COPA meeting in Europe, questions were now being asked of the Irish delegation as to why their league tables showed no evidence of education or training being given to farmers. The European Food Safety Authority subsequently agreed following the meeting to place a hold

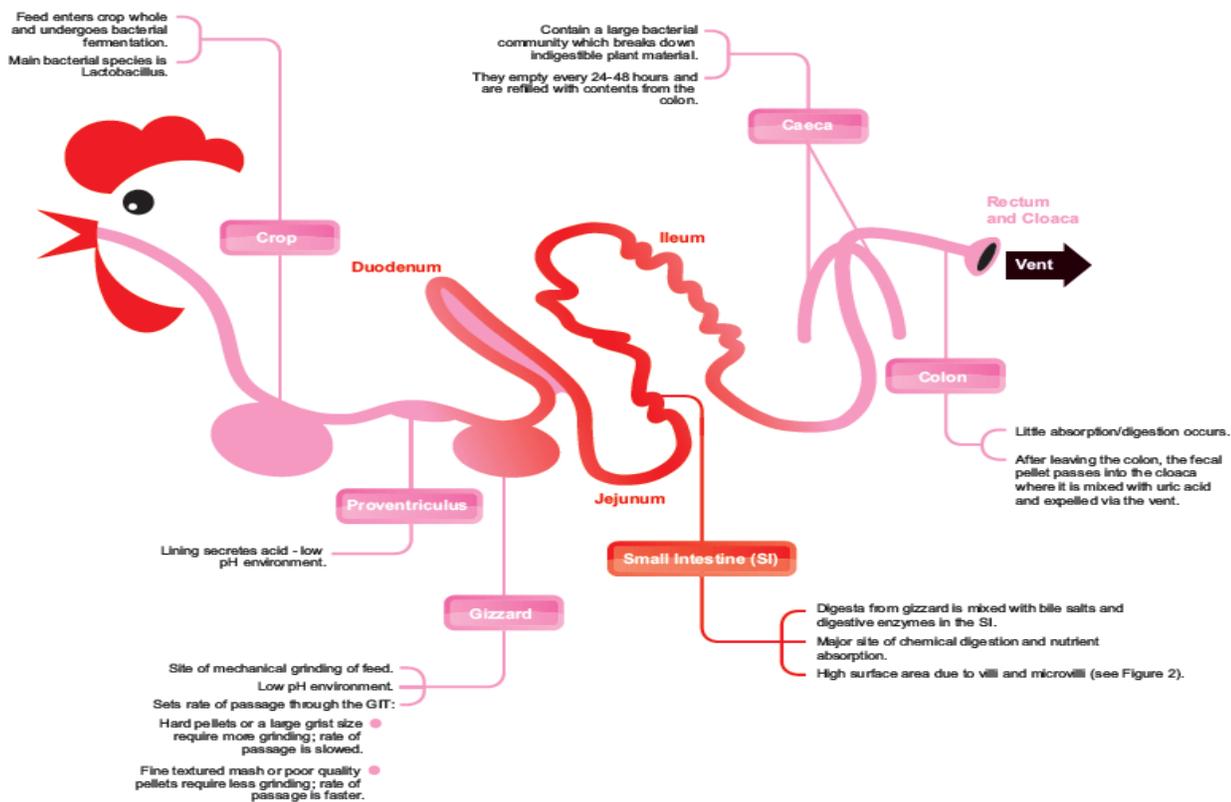


Fig 1: An illustration of the digestive tract of a broiler.

on the publication of *Campylobacter* rates, until commitment was given and delivered upon to disseminate further information to the poultry industry on how to combat the bacteria. *Campylobacter* is a naturally occurring bacterium found in the intestinal tract of wild and domesticated birds and mammals (EFSA, 2011). It is the most common cause of bacterial gastroenteritis in Ireland and Europe (EFSA, 2011). Each year the EU commission circulates a BREF (Available at: www.europeancommission.com) document, which Ireland contributes to, but due to a lack of research and development in the Irish poultry industry, or in the scientific method of analyzing data, such contributions have been muted.

As a result, it has left Ireland with very little say regarding local conditions, weather environment and other relevant information when it comes to forming policy. Teagasc is the national research and development arm for agriculture in Ireland, but the representative for poultry, Nuala King has retired. This vacancy without a replacement has left a large gap in the transfer of information from the industry to the Department of Agriculture, and has created an issue in maintaining the flow of relevant information in all directions from the Commission down to farm level.

7. World Poultry Conference

"Giving Leadership to what the Consumer Needs"

In 2013, I was fortunate to be invited to the world poultry conference to speak about "what the consumer wants". However, I changed the topic title instead to "Giving Leadership to what the Consumer Needs". Talking to a number of representatives of the large food chains, and asking the question whether they themselves believed that farms were getting the correct information about food safety, bio-security, and sustainability, the answer I was not surprised to find was an emphatic "no". Most qualified this by saying that inefficiencies and food scares would arise as a result of lack of information.



The sales and technical director of *Cobb-Vantress*, a global company using innovative research and technology to make protein available, healthy and affordable worldwide, Pelayo Casanovas, talked about using a mobile phone telecommunications device or tablet application equipped with calculation tools to keep people up-to-date with information to educate them as birds being bred in the poultry industry develop, not to mention receiving information as research is updated.

Aviagen's (Long-standing *Ross* distributor Moy Park) Richard Bailey, head of Poultry Health Sciences talked about how phone and tablet applications are the best way to relay information to a modern target audience. This type of system ensured that the correct information was received, as well as focusing users to search specifically for the area of expertise they required.

Paolo Felice Dalla Villa, Directorate General for Health and the second National Expert in policy coordination in animal welfare for the European Commission said it was the opinion of Commission that each individual country must assist the industry in deciphering EU law and directives. He said:

"It is vitally important that the poultry industry engages with the government's Department of Agriculture to outline the need for information."



The Secretary-General of the Poultry Processors of Europe (AVEC) believes countries should only use the best practice available through technologies, and that all relevant bodies must assist in this by giving the required information to each other. Mr. Vermeeren stated:

“Keeping the transfer of information from processor to farmers is vitally important”

However, as technology develops at such a rapid pace, there is always a danger of leaving some people behind. Erick Helmink from the Venco Group is aware of such a scenario and said when and how such information is transferred, that the generational gap must be taken into account.

8. A Visit To Belgium



I visited Belgium with a group of Nuffield 2013 scholars where we visited the European Parliament and met with a number of Irish MEPs, who included Marian Harkin, Independent MEP for the North West in Ireland. Mrs. Harkin is a longtime advocate of agricultural policy in the EU and she spoke about the importance of an industry which talks with “one voice”. We discussed many ways in how this can be best done, one of which concerned the potential of a single representative body, such as the now established Poultry Council of Ireland.

During this same visit I also met with Patricia Reilly from the EU commission. Mrs. Reilly qualified as a veterinary surgeon from University College Dublin in 1996, and worked in mixed clinical practice until 2001, when she joined the Irish Department of Agriculture, Fisheries and Food. She joined the Cabinet of Commissioner Máire Geoghegan-Quinn in February 2010, and is responsible for the health and consumer protection and bio economy policy areas, as well as communication and Joint Research Centre coordination. Mrs. Reilly said how horizon 2020, which started in January 2014, will make money available for different countries and universities who worked together on initiatives which sought to develop technologies to benefit the agricultural industry (European Commission. Horizon 2020, 2013). One such idea was a system to enable information transfer, which the European Innovation Fund would be in a position to bring together stakeholders and help networking for farms and farm bodies to get involved with. Pillar II funding would later provide a much larger scope in developing these systems, and be vitally important in opening up the possibility to draw down money whilst encouraging industry to engage with local government and the Department of Agriculture on

such matter. Mrs. Reilly said connecting with universities about the needs of the Poultry industry also opened the possibility for them to look for funding to examine other areas which found them also failing live up to the responsibility of opening clear channels to disseminate information within Europe.

The different stakeholders all agreed that a common thread of importance for each country's industry was to be able to talk with one voice. With the information already readily available, companies would be able to filter out non-relevant information specific to geographic location and need, thus enabling direct with their target audience.

9. Canada 2013

According to the Manitoba egg farmers (2014), the poultry and egg industry in Canada creates 85,865 total jobs and contributes 9.3 billion to Canada's GDP. In the prairies alone, 1,258 million is generated each year in cash receipts and 656.8 million in taxes goes back to support the Canadian economy. Under the supply management system, poultry and eggs are

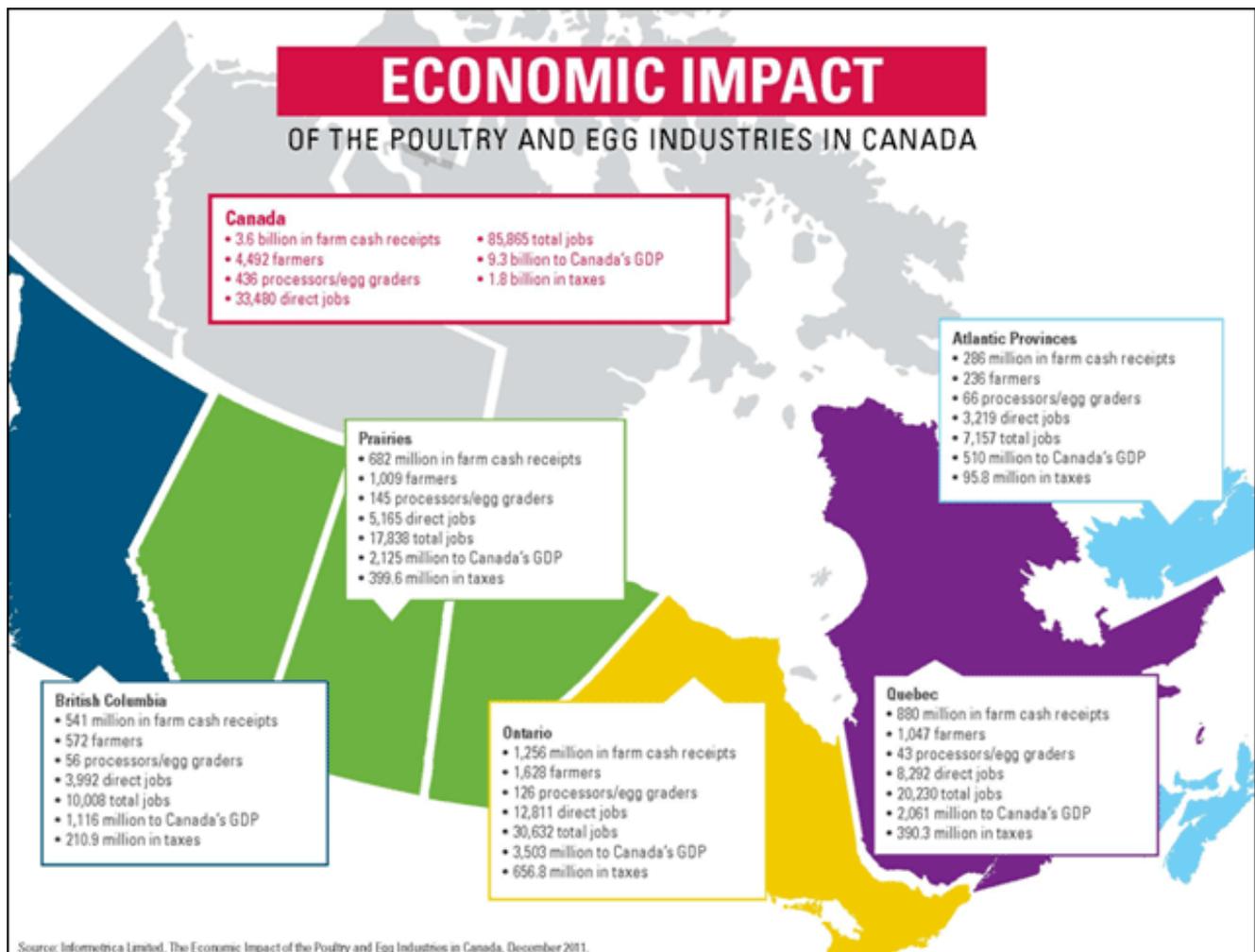


Fig 2: Economic Impact of poultry in Canada

self-reliant and do not require government subsidies.

In my opinion the poultry industry in Canada is one of the strongest and secure industries in the world. This is mainly down to the chicken industry upgrades under a system known as “supply management”. This system produces the demand in the market, a win-win for both the retail consumer and industrial producers, who get good value for their money, are a



reliable supply of high quality chicken at reasonable prices.

I interviewed Adrian Rehorst, Premier Vice President of the Chicken Farmers of Canada, talked about the security of investment for farmers. The Chicken Farmers of Canada's main responsibility is to ensure that our 2,700 farmers produce the right amount of fresh, safe, high-quality chicken to meet Canada's needs.



Mr. Rehorst said that the relationship between consumers and farmer in Canada was a healthy one, built on mutual respect. Adrian Rehorst stated that the three most important pillars for supply management were as follows:

1) Production Planning Pillar:

Under supply management farmers in consultation with industry stakeholders plan their production to provide a steady supply of quality food efficiently with the changes in consumer demands. This provides, predictably, stability so that the industry stakeholders can invest with confidence.

“As part of planning production, we use a quota system to ensure there are no surpluses or shortages of chicken on the market. Regulated chicken farmers buy quota in order to grow chicken to be shipped to processors. In many ways, purchasing quota is a lot like buying franchise rights, whether as a restaurant operator or a taxi owner: it's an investment in the stability provided by supply management. Whereas those who were in the business at the

time the system was put in place were given quota, new farmers must purchase some through their provincial marketing boards, many of which have new entrant programs to help them get started. From there, the supply of chicken is kept steady by determining how much chicken to produce every eight weeks. Directors determine that amount based on provincial requests and indications from industry stakeholders, market forces and how much chicken Canadians are eating.”

2) Import Controls Pillar:

Matching supply with demand for chicken allows Canadians to count on stable prices. This along with the predictability of import insurers means it is possible to make a living in agriculture.

“This is only possible, however, when we can safely predict how much food will be imported into the country: the predictability of imports play a crucial role in determining how much chicken we need to produce domestically to satisfy the country’s needs. To achieve this, we need tariff rate quotas with effective over-quota tariffs to control imports of chicken products in all their forms.”

3) Producers Pricing Pillar:

In Canada, farmers collectively negotiated minimum farm gate prices for chicken. Farmers do not sell wholesale, and the retail prices this system has the support of 86% of Canadians who feel it is important that chicken nearby is from Canada. 92% of Canadians agree that it is important that the Canadian government actively defend the interest of Canadian chicken.

“The third pillar, producer pricing, is what allows supply –managed farmers to receive a stable income for their hard work and form a sustainable, subsidy-free industry. In Canada, our chicken farmers collectively negotiate minimum farm gate prices – what they receive when their product leaves the farm. By acting together, farmers negotiate a fair price for their products based on what it costs to produce them. This should not be confused with wholesale or retail prices: farmers have no say on those.”

Mr. Rehorst talked about the economic contribution of Broiler and chicken farmers to the Canadian economy. In Canada there are about 2700 chicken farmers which purchases 2.4

million tons of food. This generates close to C\$2.3 billion in farm cash receipts the industry directly employs 6750 Canadians on farms. He also about talked how they also create an additional 49 and half thousand indirect jobs in feed-mills hatcheries processing transportation and the service industry.

Mr. Rehorst spoke with great pride about the industry's contribution of C\$2.5 billion to Canada's gross domestic product. Industry paid about C\$356 million to the tax revenue to Federal, Provincial and local government each year, while they invest C\$9.6 million in chicken research innovation and promotion. The transfer of knowledge is to all Stakeholders and it is seen that the consumer, processor, farmer and all other stakeholders are important to sustainability of the industry.

1. Supply management protects farmers, making it possible to make a living in agriculture.
2. Supply management ensures a steady supply and steady prices.
3. Supply management ensures farmers receive a fair return for their work.
4. Supply management facilitates implementing national programs like food safety and animal care.
5. Supply management generates jobs across the country.

Murray Booy, President of the Chicken Farmers of Ontario was very quick to point out a lot of facts about the poultry industries in Ontario. He talked about the industry been worth C\$3.5 billion in farm cash receipts. Ontario has 5765 farms, 250 processors and eighth-graders. The industry Ontario had 34,814 creates jobs in total, with 104,000 people relying on the poultry industry in Ontario overall for employment, Available at: www.chicken.CA.



Poultry in Ontario provides C\$9 billion to Canada's GDP, producing C\$1.7 billion in tax Receipts. Murray also talked about importance of University and the Department of Agriculture in the transfer of knowledge to their farmers and members. He talked about how local government and national government on how they work with all of the different bodies under the food safety assurance programme with the Canadian Federation Humane Society is the Canadian Veterinary Medical Association the Canadian Federation of Independent Groceries, Poultry and Egg Processors Association of Canada, and the Canadian Restaurant and Food Services Association.

In 2011 the Chicken Farmers of Canada, in conjunction with Canadian hatching, used Canadian poultry and egg processors to revise the code of practice that had been in place there since 2002. Getting an agreement for organizing a set of standards could only be done in an open and honest approach between all groupings, working together to bring together producers, veterinarians, academia processors, governmental departments and animal welfare groups. Together they formalized a set of standards for the poultry production in Canada. Canadian Chicken farmers, Available at: www.chicken.CA.

Jim Snyder, National Director of Agricultural Practices Development in Canada assisted in setting up these interviews.

It was easy to see that the industry was strong as the Canadian poultry industry, and that this was due to being well funded, and having the security of supply management, something which was pointed out by Mr. Rehorst. He said that *“to invest in their industry was to ensure they had long-term security in price.”*

10. Australia 2014



I visited Australia in May, 2014. I attended the PIX conference, an annual poultry information exchange which attracts over 1400 delegates each year. This was located at the Gold Coast. I was fortunate to get the opportunity to speak on the first day of the main group sessions. I spoke about the moisture in litter, about the EU welfare directive and how the EU has attempted to resolve moisture in poultry houses. This problem is more prevalent in Ireland due to the climate and positioning in relation to the Atlantic Ocean. I spoke for an hour about how to identify moisture in poultry houses.

During this workshop there was a good exchange of views and the main point of this transfer of knowledge was about doing the simple things correctly. During workshop it was stated that the modern broiler bird of today can consume 7.5 litre's of water, 5.7 litre's of which is extracted through faeces or breathing.

Due to Ireland complying with the Welfare Directive in Europe, we were able to discuss the type of heating systems we felt have a greater effect on moisture in poultry houses. Exchanging views in workshops, even though there were a couple of hundred people in the room, was a very refreshing and honest experience, as well as being hugely informative.

One of the things identified was that the retailers and welfare groups were setting the agenda.

It really highlighted the lack of information that was being implemented on farms and where welfare groups were more interested in visual changes, rather than effecting actual improvements to the welfare of the birds.

I gave advice that by allowing a group like the RSPCA to place a label on poultry was very one-dimensional. What I said was needed is a label like the Red Tractor logo in the UK, information available at their website <http://www.redtractor.org.uk/aboutus>. Red Tractor is a food assurance scheme covering production standards developed by experts. Bord BIA meanwhile is the Irish food, drink and horticulture industry's trade development and promotion body, information available at www.bordbia.com.

Where welfare is concerned, I believe change is implemented only based on science, traceability, and in the transport used by farmer, bird, feed and carbon footprint. The two bodies have nothing to do with growing of chickens and have their name on the packaging but are there to ensure a sustainable standard is maintained. Transferring this knowledge to the consumer is of vital importance. The names are a brand, and are clearly labeled on the packaging, as should the name of the farmer and the processor.

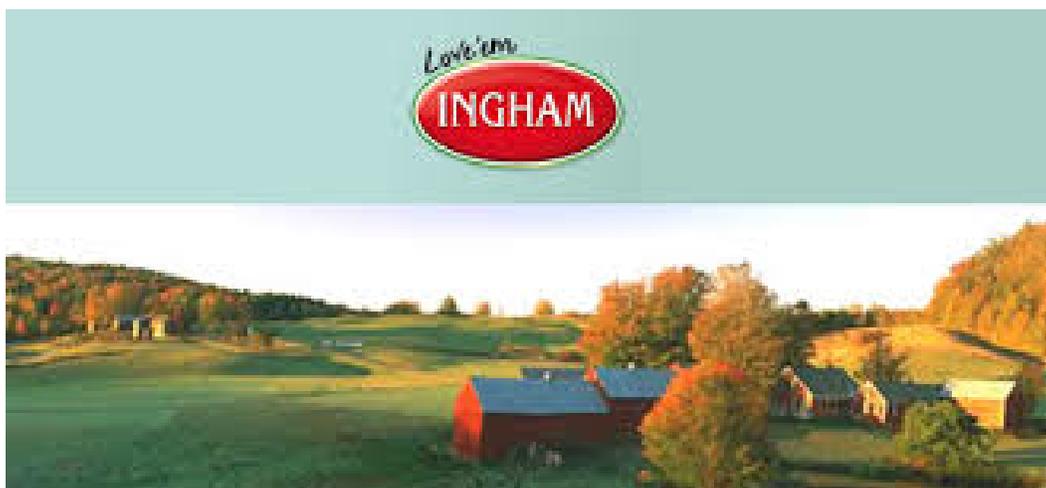
The conference gave me an opportunity to talk to the Department of Agriculture in Queensland about how a lot of standards used by them are imported from the UK or EU.

The standards that the retailers are looking for in conjunction with the welfare groups are not Department standards. This in turn has created a level of confusion with farmers and consumers of what is law, and what standard has been created by the supermarket, through interference with the system and without any substance. Talking with representatives of Queensland Department of Agriculture they pointed out that there was a trend where welfare groups were setting standards outside of the parameters set by the government. This too has left it very difficult for the transfer of knowledge to farmers as they were receiving conflicting information and querying which standards was to be kept.

I met with fellow Nuffield 2013 Scholar, Jodi Radcliffe, and Chairperson of Queensland Poultry Farmers.

I attended a meeting in Brisbane where the average size of the farms was 180,000 birds, of which there were about 5.5 crops per year. The difference in European growth was the weight in which the bird was considered ready, where in Europe a bird is generally finished at 2.7kg with weights varying between 1.8-3kg (Farm Animal Welfare Advisory Council, 2008).

Due to the weight difference, European farms tend to breed a minimum of one to 2.5 crops more per year.



I met with the number of advisers from Inghams *Enterprises*, an Australian privately-owned poultry and fodder supplier and producer, who pointed out they were now moving towards a more European style of finishing, with the most prominent bird, the Ross 308 being used.

Principle advisor at Inghams Kielly McTavish showed me around farms in Queensland,

ranging in size from 150,000 to 400,000 birds.



Globalization is very evident in the Australian poultry industry at all levels as they utilize equipment that is standardized all over the world, for example feeders, ventilation, water drinkers and housing.

The majority of farms had their own dam for water and this not only ensured the water was bacteria free, but they had also put a lot of work in the palatability of water with the use of different types of acids to get the PH correct. This had the effect of better utilization of the chlorine in the water.

I also spend time on Wayne Redcliffs' farm, a 200,000 plus birds unit in the north of Brisbane, a few miles from the Sunshine Coast. This farm was an efficient farm and a Redcliff a second generation poultry farmer. It had seven modern houses with tunnel ventilation. Talking to Mr. Redcliff he pointed out that they had deep litter due to a problem in disposing of it. He said he worked closely with the Department of agriculture in Queensland in relation to learning about other types of farming which benefit from the NPK of Poultry Litter.

Mr. Redcliff is surrounded by pineapple farms, which at the time were using a lot of artificial types of fertilizer. Transferring knowledge to the pineapple farmers and getting them to use poultry litter not only removed the cost of transport and removal of litter for Mr. Redcliff but also boosted working relations with other industries in the region. Mr. Redcliff's farm organization is now working closely with the Department of Agriculture in lobbying local industries which could benefit from similar relationships. The problems of using poultry litter, such as botulism have been discussed by DAFM, Available at <https://www.Agriculture.gov.ie/animalhealthwelfare/diseasecontrol/botulism>, and trying to sell it to other farmers are universal, both in Ireland and Australia, but all are looking at biomass energy creation as an alternative to land spreading.



Queensland farm with 250,000 birds with Ingham's farm advisor Kelly

Travelling to Adelaide I visited the company Spanlift. *Spanlift* Broiler Buildings in Australia specializes in pre-engineered steel framed buildings for industrial, commercial and rural applications. There we visited a number of farms. One of the founding members of Spanlift who showed me a unique design of poultry housing was Jon Cox, whose parents are from Northern Ireland.

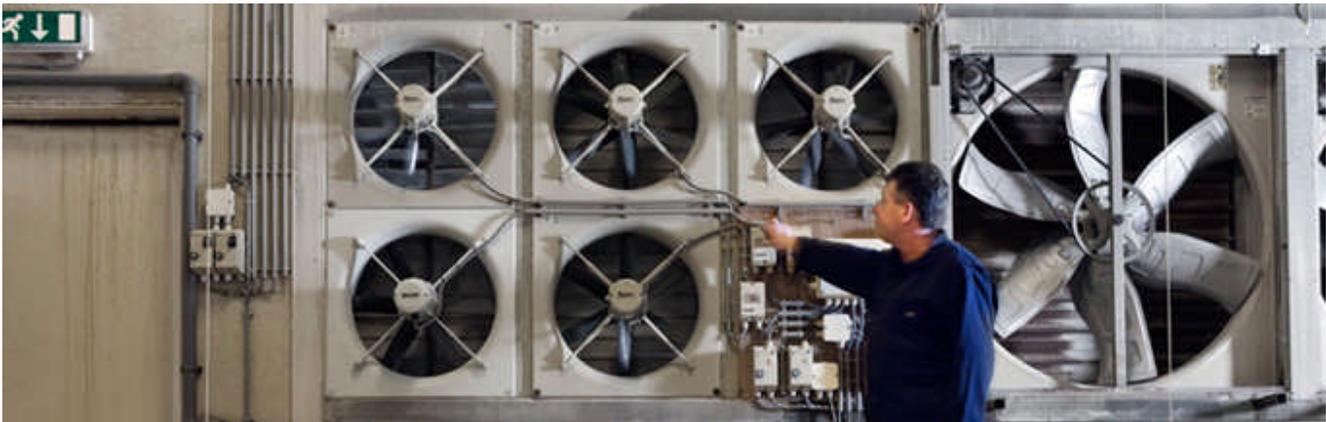
One of the sites we visited was outside Murray Bridge which had a capacity of 600,000 birds.

The unique design of the house that Spanlift created was with a curved roof which did not need baffles like the other places we had seen in Queensland and New South Wales. This therefore allowed a smooth transfer of air throughout a house. Water on this site travels over 15 km to reach farms in the region. Many of these new farms were owned in partnership. The cost of building the houses is considerable when you don't have concrete floors or yards.

All of the floor and yards are compacted. The price of the housing is €16 per bird, where in Ireland and the UK it is around about €10-11 per bird. In mainland Europe it can be up to €14. In Ireland UK and Europe though this price includes concrete yards and floors inside the houses with almost double the installation.

I found there was also a shortage of trained managers on farms in Australia. This became very evident where farms are in partnerships or considered investment opportunities, and not necessarily family run. A manager from one of the farms we visited was from Iran. This manager was a former lecturer in a University Iran and had never worked in poultry production before. This problem was probably more adverse in poultry than other types of agriculture. Similar problems arise in Europe and North America.

When I travelled to Sydney I talked to the Department of Agriculture in New South Wales. We discussed bio-security on poultry farms on the east coast and the problems with



combatting different pathogens, like *Campylobacter*, *E.coli* and *Salmonella* in the poultry production and slaughter chain. They hope to see deep litter production cease over the next couple of years.



Fancom have always been forward thinkers. They are a global leader in the development of IT and automation systems for the intensive livestock

husbandry sector.

The EU has set parameters for broiler welfare in the European Welfare Directive. Examining this Fancom looked at the directive and considering some of the methodology of assessment crude and one-dimensional, they started PLF or **Precision Livestock Farming** (iFarming, 2014).

Ensuring that the welfare of animals is maintained Fancom have used technologies that are available to precision livestock farming to optimize the contribution of each animal thus delivering the best results. One of the points Fancom told me, was that when designing PLF, the technologies used are readily available, and operational 24 hours a day.



This means that decisions can be made on a continual objective assessment as opposed to a point in time check, This enables a policy of management to the farmer who can devote his time instead to investigating only those situations in which actual results differ significantly from the planned results. By using cameras and sound, it is possible to measure behavioral aspects in chickens, combining this with the other environmental factors, feed, and water and ventilation requirements. By combining these it is possible to place a value and how efficiently a chicken has grown, and also the welfare and social experience of a healthy chicken to the point of how it lived and ultimately how safe it is to eat. (iFarming, 2014).

The EU funded Fancom by placing i-farm technologies and assessing these in sites all over Europe. Climate control measured the thermal comfort of the bird, CO2 and airspeed. This assesses good housing and environmental control. Appropriate behavior meanwhile is

monitored through camera systems which check for activity distribution and stocking density. Simon Lague, Fancom Product and Business Development Manager has told me his motto is: “putting figures into welfare and science into modern farming”.

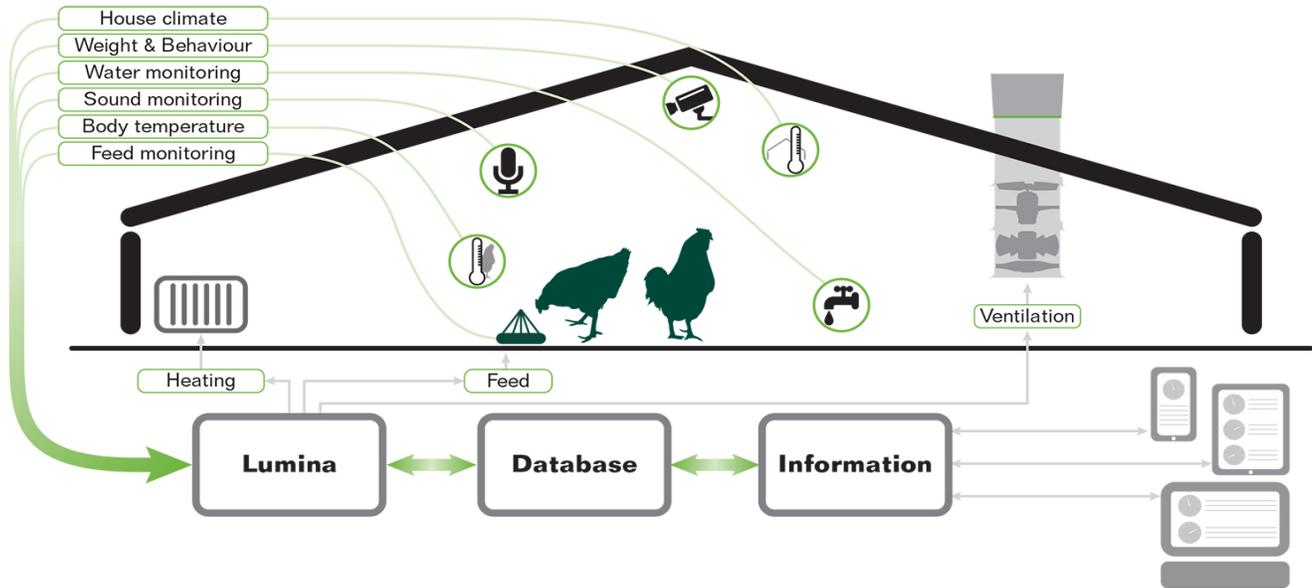


Fig 3: Fancom iFarming

The information is collected not only create an understanding for farmers and his birds, but to give fast facts and figures for local agriculture departments in relation to the EU welfare directives. As a result, farmers will have a better and more fluid approach to implementing policy in relation to the welfare of broilers or animals.

When visiting the factory at Fancom, I received a number of presentations by research engineers on how they view the birds surrounding environment. Their opinion was to act on preventative measures rather than cure.

To try and bring this system to Ireland, I invited Mr. Lague to meet with the Department of Agriculture and Teagasc, the agriculture and food development authority in Ireland. Their mission is to support science-based innovation in the agri-food sector. The reason for asking Mr. Lague to speak with them was to show how i-farming can access welfare parameters, but also allows researchers to discover a broader-spectrum of information with experiments on farms on a continuous basis.

Benefits of having private farms linked up to Department of Agriculture is that it could allow them to monitor what is happening to research and development on an ongoing basis. This type of welfare dashboard has many advantages, providing:

- 1) Clear evidence of welfare experience of the animals during the growing cycle
 - 2) An ability to compare findings at slaughter with growing phases welfare measure
 - 3) A clear indication of how the welfare of animal impacts performance
 - 4) How to create good dialogue with the farmer to the consumer by putting figures on welfare
- (Fancom Data management, 2014).

11. The Broiler Welfare Directive



The Broiler Welfare Directive (BWD) was adopted in the European Union (EU) due to public concern about animal welfare (AW) and food safety, all directive information is available at http://ec.europa.eu/food/animal/welfare/farm/broilers_en.htm. The BWD aimed to improve AW, resulting in healthier animals entering the food chain, which is an essential component of the legislation. This is part of EU food safety strategy (European Commission, 2013). AW indicators are used to monitor on-farm broiler welfare. These include footpad dermatitis (FPD) and high mortality. Broilers are reared in intensive housing conditions which directly expose them to welfare issues. FPD is multi-factorial and the main indicator of welfare used in the EU. Slaughterhouse checks were carried out by the abattoir for FPD levels. The BWD requires the slaughterhouse Official Veterinarian (OV) to examine birds at Ante-mortem (AM) and Post-mortem (PM) for evidence of welfare abuse originating on-farm, to analyze these data and data on FPD levels and to issue notifications to the farmer and the local district veterinary office (DVO), if thresholds are exceeded. The farmer is required to take appropriate remedial action. In this project, data on AW notifications from 2010-2013 from a slaughterhouse in Ireland slaughtering 40 million broilers annually were analyzed to investigate the impact of the BWD on welfare indicators and also to determine if a relationship could be demonstrated between the welfare indicators, particularly FPD and housing conditions, bird type and the farmer. A database was created by merging the abattoir FPD

lesion score data with AM and PM evaluation data. Data analyses showed that footpad lesions had not improved in the twelve months since implementation of the BWD, it shows seasonal variation in levels of FPD and that significant risk factors include breed, the farmer, rearing system, bedding material and sex type. Results from this research could be used to determine if follow-up action on notifications is adequate and if thresholds for issuing notifications in Ireland are appropriate (O'Reilly, 2014).

The two main breeding companies that supply Broiler chicken are Cobb and Ross.

These companies provide almost 90% of the genetics of the chickens we eat around the world (Kleyn, 2014). Because most of the Broiler poultry industry is virtually integrated, the main results breeder companies look to achieve are feed conversion and yield. Their main customer is poultry processors. When reviewing the breeder companies' website you can see that there are differences between their manifestos and that of the welfare director in the EU, available: <http://www.cobb-vantress.com/products/cobb500> and <http://en.aviagen.com/ross/>. A simple observation is the Ross 308, where the light programme in the directive seems excessive. Many farmers have experienced a detrimental effect on gut health of the Ross 308 and with the Cobb 500; there are problems with leg integrity.



PJ Reilly, Veterinarian with the Department of Agriculture in Ireland studied welfare directive footpad lesions as a key parameter whose study has been mentioned earlier showed that some breeds of birds are more prone to footpad lesions and that the Ross 308 were more prone to footpad lesions over other breeds. This study was done over two year period at the Manor Farm processing plant in Shercock, Co Cavan in Ireland. The study followed three different types of breed the Ross 308, the Cobb 500, and a Hubbard JA 57. The free range bird was far lower for footpad lesions and that was because that was not because it was free

range versus commercial as first though. When the Ross 308 was used in free range housing, similar footpad lesions resulted. Since this study was finished, within the manor farm group the Hubbard F-15 has been introduced on a small scale and the footpad lesions are almost non-existent, with the number of very good feet showing scores of 90% + and almost 100%. (O' Reilly, 2014).

This study has shown that the transfer of information from the EU Commission on bird welfare should be breed based and that the Commission should allow more flexibility in the parameters of growing broiler birds, not merely a set of points like hours of lighting and what lux should be at any point in a bird's cycle. Humidity should be also be flexible depending on excessive weather conditions. Electronic assessment of conditions and environment of poultry house would be far more accurate way of assessing welfare if there was more flexibility in the parameters of welfare set.

Abstract of PJ Reilly study and graphs

Month & Year Figure 2 Mean grade 2 FPD score over time by Breed Type

Rearing system: The analysis showed significant effects of bird type on FPD score ($P < 0.001$). Free-range breeds had a tendency for a lower FPD score and less seasonal variation than both broiler breeds Cobb or Ross (figure 3). The mean FPD score was free-range 12.26% and broilers 23.43%.



12. SKOV

SKOV is an industry leader on the international market for climate control and production monitoring of animal production. SKOV ventilation systems are installed in all parts of the world.

Camilla Fisker, Poultry Specialist with SKOV stated that there is challenges when questioning the problems with the welfare directive, as it suggests you are potentially against welfare in poultry production. Ms. Fisker talks about how they have set up a poultry group of representatives involving stakeholders in the poultry industry in Denmark. The group consists of representatives from processors, hatcheries, producers, veterinarians, egg packers and poultry specialists.

Similar to Ireland this has given a sense of leadership to the industry and filters out non-essential information whilst prioritising the needs of the industry only.

SKOV believe that the technology today means that the EU directive can be paperless as information required can be all done electronically, involving mortality, humidity, co2 and temperature. The problem for local departments is that the EU directive does not allow them to be flexible. It is clear that the EU commission needs be more flexible and have a better understanding of the poultry industry at local level. A one size fits all approach is not the answer.

Assessing the environment has shown that farms do see breaches in the parameters when weather conditions are extreme i.e. problems with humidity, CO2. The lighting programme in the EU welfare directive is not breed specific, and does not allow the farmer the flexibility to

deal with bird welfare by changing the level of lux.

Up to the minute information is one of the key elements in increasing production efficiency and reduction of costs. The linking of the ventilation and production feed systems to the customers home computers, smart-phones etc., either available from SKOV, Big Dutchman and Stienen, all connectible to PC or iPad and tablet type devices can give the customer instant and up-to-date information on the parameters in their individual system. For example: Current temperatures, ventilation level, humidity, heat consumption, water consumption, meal consumption and the alarm conditions etc. This availability of information is of course key in reacting to the bird performance in order to get the maximum production efficiency from the flock (IDS/ Skov Ireland).



13. The View from The UK

In my opinion the UK poultry industry is in many ways the envy of poultry producing countries. Their farmers have in the past been left open to cheap imports from third-party countries. Many of the disease scares in food for example BSE, Foot and mouth, salmonella in eggs have originated in the UK. The media meanwhile have often highlighted welfare problems in poultry to excess, to the point where celebrity chefs publicly supporting the use of British bred birds. This has left the U.K.'s poultry industry stronger and more open to the public. The poultry industry in the UK realized it was only as strong as its weakest link. This brought the stakeholders together to provide a minimum training for all aspects within the poultry industry.

The industry came together with the Poultry Council and the NFU to look at formalizing an education System and minimum training for those people participating in the poultry industry.



The British Poultry Training Scheme was established by a working group to develop a consistent level of training for each job role across the UK poultry industry with an industry wide training recording system.

As stated by their website: 'Each job role has a

minimal training requirement which is defined on each member Poultry Passport. As training is completed it is recorded by the scheme administrators on the Poultry Passport. This clearly identifies where training has been completed and where further training is required. Training courses are approved by the scheme administrators where courses meet the minimal content standards as set by the industry working group. Courses can be delivered in-house or by training providers once they have successfully gone through the approval process.' Information available at: <http://www.poultrypassport.org/>.



Charles Burns after NFU and chairman of the Copa poultry and eggs, Gary Ford NFU poultry adviser

Talking to Charles Bourns of the NFU, and Chairman of poultry and eggs in COPA, he pointed out that before the passport system was introduced, farmers did not know where they could access necessary training. This passport system had a double edged effect ensuring that farmers were not only up-to-date with the welfare directive, but also training. The passport system gives people the flexibility of adding modules covering sustainability and bio-security. The passport system also recognizes and gives consideration to the number of years of experience. As education and training never stops, you can continually update your passport.

While I was visiting farms on the east coast of England, in Derby and Nottingham, I saw the importance of investment. One of the farms we visited was Wards', a large arable farm which had built eight new poultry houses with a capacity of 400,000 birds. They were looking to utilise the poultry litter as a bio-digester, and ultimately use the left over for their crops.

The next farm had about 200,000 birds, with both wooden and steel Houses, and they there had received RHI renewable energy grants which made up a considerable part of the enterprise's income, up to 30%. This injection of capital and ongoing is seen as a real boost to the industry.

On all the farms they talked about the additional income from the renewable energy being swallowed up and used to substitute money for their poultry. The farmers also talk about how new units, and getting contracts from processors were being told the additional income from renewables is part of the overall package for growing poultry.

All five farmers I spoke with agreed that the passport system was an innovative way of setting minimum standards for people working in the industry. It would ensure with good knowledge less mistakes would be made in the future.



500 K farm with farm manager Kieran in Nottingham

Nigel Joices' farm in Norfolk is a great example of how modern technologies, as well as ways of engaging with the consumer are foremost on their agenda. On this farm they have a viewing gallery so that people can see what is happening inside the poultry house. He and his brother Patrick also utilise modern technology to heat the poultry houses with the use of biomass in the form of Poultry Litter. Nigel's model is that modern farming should both be able to utilise the most modern technologies along with being able to bring consumers with them in the form of an open door policy. This farm is a great example of a modern farming and can be used as an example of a safe healthy and affordable food production to consumers.

High bird welfare and low-cost poultry production may seem like conflicting objectives to some, but at Uphouse Farm in Norfolk, the two go hand-in-hand. Nigel has been growing chicken on the site since 1997, initially with an eight shed unit, funded in part by the sale of 200ha of arable land. A further eight sheds were added in 2004 – taking total production to 5.5 million broilers a year. "Welfare has always been top priority at Uphouse," he says. "To be able to sleep at night, I have to know my birds are living in a good environment." Biosecurity is an integral part of this. Arriving at the farm entrance, all vehicles get a good soaking from the automatic jet sprayers, to minimize any disease risk from visitors. There has also been

significant investment in the sheds, which are now among the most sophisticated in the country. For example, they are all kitted out with misting equipment, to raise humidity at chick start, for evaporative cooling in extreme heat and for disinfection at the end of every flock. "Having a sterile start is hugely important."

Computer technology connects all the poultry houses with the farm office and all staff houses, so the birds' environment and feed/water consumption can be checked 24/7, with adjustments made as necessary. But Nigel believes strongly that computerized technology is merely an aid to good management. "The computer that can see, smell and listen does not exist, but the good stockman does," he says.

The poultry industry in the UK is at its most positive for many decades. With its stakeholders speaking with one voice i.e. the poultry Council and the NFU, the industry is in a positive frame of mind and have done exemplary work in passing on a minimum standard of training and education to all stakeholders.

14. The View From Europe

René Danau, Policy coordinator **European Commission**

DG Health and Consumers Animal welfare.

In talking to Mr. Danau from the EU commission about the problems of information transfer, he promised he will follow the matter through to the communication section at the Commission. The Commission is very receptive to looking at ways to communicate to farm level. At present when laws and directives are published in the official Journal it is up to the individual Member State to pass on information. The commission has noted that smaller countries, with smaller sections in agriculture are not compiling or forwarding this information, and this has led to a large gap being created in the level of information available to any sector. The austerity problem within Europe has made this a far worse situation, as countries consolidate services. For example, by not replacing the personnel in research bodies like Teagasc.

15. The View of Our Minister



Interviewing the Minister for Agriculture in Ireland Simon Coveney, he said that the poultry industry, in order to develop to the next level, needs to speak with one voice and prioritize objectives if it is to avail off the finite amount of resources available.

Since meeting the Minister, the newly established Poultry Council, a body has representatives of the processors, farm producers, egg packing stations and veterinarians, have worked with a high-level group which includes EPA board members, Bord BIA and Department of agriculture officials. This body works well in understanding the most pressing needs of the industry. The poultry industry is now catered for in the new Rural Development Plan, and following on from this, the Poultry Council hopes to now begin to work with Teagasc in looking at a similar solution to develop training with a view to implementing the UK standard passport system.

16. The Round House

The issue of transfer of knowledge should always be taken into account. The generational gap within any industry and the methodology of the transfer of information needs to be catered for, as does the number of options available to send and receive the information for assessment. The transfer of knowledge to consumers is becoming more important due to the reduction of farms and farm personnel in the community.

Taste events have allowed large number of consumers to receive relevant information about food. They have therefore become vitally important as a platform to inform consumers of the farm to fork mindset. By doing this they put a face on farms in personalizing the farm, whilst showing the importance of the primary producer in job creation, food security, and carbon footprint. Examples of farmers at taste events are Bloom in Dublin, or Taste of Cavan in Cavan. The farmers outline their story before each cooking demonstration followed by secondary and territory producers. Chefs follow this on by cooking ingredients directly provided by the farmer or the producer. Modern farming has been done an injustice by many marketers in recent years. Advertising has displayed a false view of modern farming.



Ventomatic by thinking outside the box show that the most up-to-date methods of intensive farming can be sold to the consumer. An example of this is the roundhouse or Rondeel in Holland, which must be the only chicken house with a children's play area. It is a major tourist attraction not only because the eggs are sold in cartons of seven...

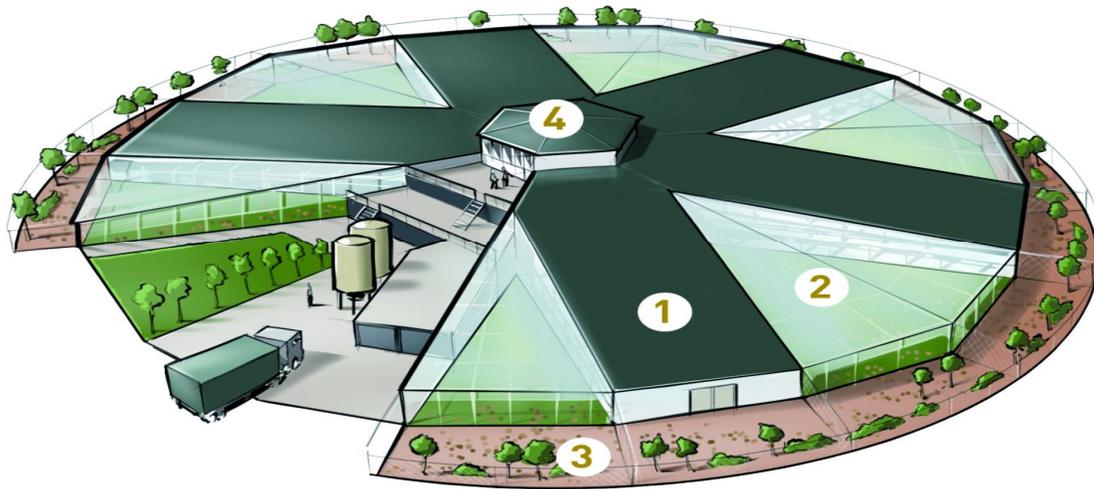


Fig 4: The Structure of the Rondeel House.

The Roundel has been designed and equipped to allow all the birds to indulge in their natural behavior, while also taking into account the fact that practices, such as beak-trimming, will not have to be applied. They describe the system as below on their website

<http://www.rondeel.org/uk/the-system/>.

1. The **Night Quarters** 'provide living space for the primary needs of the hens: eating, drinking, resting and laying eggs. In this area existing technology in the poultry sector, such as laying nests, aviary system etc., have been used'.

2. The **Day Quarters** 'provide space for the hens to indulge in their natural behavior such as foraging and dust bathing. The natural world has been brought indoors. A unique feature of the system is the insulated blind which acts as a side wall and which can be



completely rolled up. This creates a uniform climate between the day and night quarters. This encourages more birds to use the foraging area to range and dust bathe than in customary systems'.

3. The **Wooded Area** 'also creates a natural environment for the hens so they can forage, explore and find shelter. Should a calamity occur (for example, an outbreak of avian influenza) which requires the hens to be confined, this wooded area can be closed off. However the hens can still access the foraging area where their natural needs will be satisfied. This is another unique feature of the Roundel in comparison with other housing systems!'

4. The **Central Core** consists of three areas:

- 'The ground floor is the working area for the poultry farmer;
- The first floor accommodates an area where visitors can see how the system works. This visitor facility covers an area of 150 m². From here visitors can proceed through a glass tunnel at the same level as where the hens are housed in one of the living areas. This is also another distinctive and unique feature offered by the Roundel! This area on the first floor can also of course be used for other purposes.
- The second floor houses two heat exchangers, which are used to control the climate in the night quarters and to pre-dry and dry the manure the birds produce.'

The Roundel's core equipment is all industry standards but by thinking differently and presenting it to the public as something positive the effect is overwhelmingly positive.

17. Technology Gives Us The Tools To Improve



When interviewing the CEO of Communicorp, Denis O'Brien, he spoke about always using the most up-to-date technology to stay ahead of your industry.

Mr. O'Brien has mobile phone networks all over the world. He talked about Haiti which has 4G network rolled out over the island. Even though the majority of the customers may not need it, this is an investment for the future.

Mr. O'Brien outlined the value of agriculture in Europe and in Ireland.



He pointed out that for countries like Ireland to remain premier producers of affordable, healthy and safe food, we have to use the most up-to-date technology and keep our farmers at the forefront of training and education. He made the observation that European Union has announced itself to be technology led trading block which lends itself to the transfer of knowledge through technology.

18. How Do Growers Acquire New Knowledge

As described by Guillermo Zavala, Avian Health International:

‘As you probably know, the US poultry industry is fully integrated but the growers or farmers are owners and keep poultry on a contract system. Companies compete for the best growers and the contract characteristics determine who ends up growing for each company. Some growers may be professionals that own farms and hire workers to take care of the chickens, and some own their farms and work at their farms as a sole source of income. That is, some are highly educated but most are not. In this country of excessive litigation, companies prefer to communicate directly with their growers and it is each company who conducts any kind of training, which essentially is very little. Communications with the growers relate almost exclusively to items regarding biosecurity, production systems, welfare, and the actual contract conditions and implications. Only the local State or official laboratories through their personnel may choose to conduct educational programs that involve disease prevention, but all other matters are the responsibility of the integrators. Because integrators are so large, the end result is in reality very little education and training. There are exceptions, but mostly there is little education and training. In summary, each company might have some form of education or training programs, but in all honesty these are minimal. So, the question is: how do growers acquire new knowledge? Could it be Word of mouth, trade magazines, and local technical meetings? The service person (or technical representative of each company) is who bears the burden of educating and training growers. A service person will service a farm at least once a week but often more than once a week. On each visit, the service person addresses any sort of issues from ventilation, to welfare, to housing and equipment issues, health issues, etc.’

19. The Processor's Plan



Justin Carton is part of the 8th generation of the family run company "Carton Bros" who have been producing Manor farm Chicken in Ireland for over 200 years. I must admit a slight conflict of interest as we grow our chickens for Carton Brothers.

Justin explained to me Carton's concept of Smart Integrated Farming for the poultry industry in Ireland.

"We are developing a cost effective cloud-based data analytics system using data streams gathered from broiler houses to monitor living conditions and general responses (health proxies, "happiness index") of chickens, thus enabling inferences to be made on flock husbandry, operational efficiency, health status, animal welfare and disease risk. It aims to identify emerging disease risk scenarios and react with positive interventions to ward of such disease incidences.

It is a pro-active approach to production monitoring and reducing issues affecting the 'Happiness' of broilers, and is also an aid to the veterinary inspectors, giving them warning of potential risk situations.

It focuses the control and monitoring function back towards the production houses, which is where issues develop, and where good husbandry intervention can react to minimize such risk."

This is a novel approach to addressing disease/welfare risk minimization, and will enhance the effectiveness of the national disease/welfare control and monitoring protocols.

Algorithms will be developed to provide informed improvements in operational efficiency, control infectious diseases and enhance in-house broiler environment welfare.

It complements “Brand Ireland” requirement for safe food produced with high levels of broiler welfare, systems monitoring and control.

20. Conclusion & Recommendations

Conclusions and recommendations:

1. Each stakeholder in the industry needs to prioritize its needs and give leadership (Poultry Council)
2. Modern farming has to transfer information to the consumer in the new innovative way like the example set out in the summary (Taste of Cavan)
3. Food companies need to Market food to reflect the relationship of modern food production (Ventomatic, round house)
4. Any transfer of knowledge to farmers needs to be multitiered to conquer the generation gap within an industry. (Passport system in the UK)
5. The Commission and national governments need to improve knowledge transfer of the EU laws and directives. (The commission is looking into improving communications with farmers about directives)
6. The technologies and methodologies of the transfer of knowledge are well documented it needs leadership in joining up the dots.

At the start of my Nuffield scholarship I invited the designer of the original Apple Mac computer Jerry Manock to visit my farm in Redhills. I had asked him to give his thoughts on the transfer of knowledge to all stakeholders. Mr. Manock talked about how the industry is very technically advanced in how it runs the different sections within the industry and believes the use of data sharing in the cloud could allow an already technologically advanced industry to overcome the issue with how to transfer of knowledge already compiled. Most importantly he also talked about the problems we were facing were opportunities to do things better. Apple's motto is about how to "think outside box".

This brings us back to Cecile Steele. How many of us would see the delivery of the wrong order of too many chicks as a problem. Cecile saw it as an opportunity to be grasped with both hands. Likewise the problems of the industry today. Technology has given us lovely tools to turn our problems into opportunities; to make farming better: - for our livestock, the consumer and ourselves and our families. Like Cecile did all those years ago we should grasp that opportunity with both hands.

Now Back To Work.....



21. Appendix

Additional Photos:

Picture 1 & 2: Spanlift Australia



Picture 3: Murray Booy



Picture 4: Adrian Rehorst



Picture 5: Nuffield Scholar Kate Mason with Enda Kenny the prime Minister of Ireland.



Picture 7: Patricia Reilly of the Cabinet of the commissioner Maura Geoghegan Quinn



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