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Innovation & Technology in Crop Production

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Crop production in Ireland is heavily reliant on land availability and mobility. As a tillage farmer, my business is almost entirely based on leased land and conacre. With the onset of commodity market volatility in 2008, growing cereals on leased ground in Ireland has become very risky for all but the most efficient growers. I am not one of those as we are predominantly root crop growers, 1,250t of saleable carrots, 200t of daffodil flower bulbs and 7.5 million stems, all per year. Input costs have also been consistently increasing year on year.

Growing almost 400 acres of cereals in 2009, as well as our root crops, it was a very poor year and prompted me to apply for a Nuffield Scholarship to examine where I want, and more importantly need, to be in the medium to long term as a tillage farmer in Ireland.

The Study Tour

Starting in Wales and England, the study took in a total of 9 countries on 4 continents over 14 weeks, 12 of which were continuous. These countries were:

- Wales
- England
- USA (Illinois, Iowa, Minnesota, Wisconsin, Nebraska, Kansas & Missouri)
- Peru
- Bolivia
- Argentina
- New Zealand
- Australia
- Indonesia

The EU

Before the tour had begun, I had already hosted many travelling Nuffield's from Australia and New Zealand. A common debate was the €270/ha average EU support and its effect on EU farmers. As a subsidy recipient, I am grateful for the support, but similar to a crutch feared what would happen if it was taken away. In 1984, New Zealand abolished subsidies overnight which many predicted would be the death knell of New Zealand agriculture. However, in the interim period, New Zealand agriculture has gone from strength to strength with a market focused production system. Dairy was the big winner with a 74% increase while sheep, traditionally associated with Kiwi farming, suffered a 41% decline.

In Ireland, subsidies are a major obstacle for tillage growth as they have been capitalised into land values, creating false lease and conacre values on land. Subsidies have also locked up land, supporting inefficient hobby farmers who consistently lose money on their farming operation to simply collect subsidies on land which should be better used.

Average farm incomes are among the lowest industrial averages, this from a sector which provides the only resource we actually can't live without as humans, food.

Heavily influenced by France and Germany where the average farm size is only slight larger than Ireland, EU support, while marketed as a farming policy, has become an environmentally based social policy with very little emphasis on commercial farming. We are being kept on a drip to provide cheap food and to return French and German politicians to government.

Corporate Farming

Conversely, agriculture outside the EU has become an exciting world. Comparable to any Wall Street traded companies, investment based farming is booming around the world. Adecoagro, the investment vehicle of the world's second most successful self made investor George Soros, is one of those firms that see agriculture as a growth industry for the future. Soros has pumped over \$455 million into Adeco, who now farm over 200,000ha in Argentina, Brazil and Uruguay. This is surely a good indicator of the global perception of agriculture. Land is finite, population is increasing and we all need to eat.....simple economics where land and inputs are cheap.

Where yield and price per tonne are similar for wheat, the Argentine farmer will immediately be €546/ha worse off than his EU counterpart due to 23% retention tax on wheat in Argentina and a €270/ha subsidy in the EU, but still crop production in Argentina is more attractive to investors than in the EU due to its very low cost of production.

On a smaller scale than Adeco, corporate structures are being employed by progressive farms around the world. Adding structure, clarity and accountability, corporate farming is not the demon the media would have us believe. This business minded approach is echoed by the Kiwi dairy man. Unlike ourselves, who can often mix emotion and beliefs with facts and business, the Kiwi's are unemotional and view farming as simply business.

NZ dairy farming is in a very bullish period with farmers heavily leveraged for growth based on China, however it would only take a slight wobble to catch many of these guys as they are sailing very close to the edge.

Biotech

Having viewed low cost farming in South America, New Zealand and Australia, it quickly became apparent that we as high cost producers are the ones creating a margin for our lower cost competitors. How will we compete?

New technology, developed and adapted through R & D within Europe is needed now; the longer we sit idly by, the further these nations are pushing ahead. GM is a technology that we need.

Spending time in Monsanto's HQ in St Louis, Missouri, it was evident the pace at which the rest of the world is advancing with GM while we sit on the fence. Just down the road, Kansas state researchers explained to me that GM is *"simply accelerating the archaic process of plant breeding and with correct regulation which ensures only within species crosses, there is no danger with GM"* The K-State guys added that the EU stands to gain the most out of GM as we operate a high input system that GM could greatly reduce.

Hydrogen power

In the future, energy will be a key factor in crop production. Hydrogen power, being pushed by New Holland in agriculture, is potentially the energy of the future. Splitting water (H₂O) to hydrogen (H₂) requires low levels of electricity, amounts that could be generated by on farm wind and solar generators. Currently costing €300,000 for 2hrs cell life, the technology is in its infancy but think how quickly mobile phones have advanced in a short time. Keep in mind this technology will not be funded or viewed favourably by the oil industry.

No-till

No-till, which can only be achieved with a specific no-till drill, is a technology which we will need to evaluate for future production. No-tilling 3,000 acres in the UK, Tony Reynolds has enjoyed £22/ha versus £207/ha establishment costs, diesel usage down from 92 to 46 litres/ha, all while maintaining yield at 10t/ha for wheat, albeit with a dip in years two and three down to 7.5t/ha. No-till requires a complete mindset change, a factor which has contributed to its poor image in these parts as conventional practices were applied to no-till systems in the past.

Precision farming tools such as auto-guidance, soil nutrient and type mapping, yield mapping and boom auto-shut off on sprayers are also all going to play a major part in crop production in the future. Controlled Traffic Farming (CTF), which encompasses many of these tools, is a production system that reduces field compaction by using GPS to keep all machines to the same tracks, a potential aid in reducing compaction and lifting yield in an Irish setting, warranting trial work under Irish conditions.

Conclusion & Recommendation

Agriculture worldwide is a major growth industry with exciting opportunities all around the globe for crop production. Europe has slipped into the shadows as a global player with its focus changing to environmentally and socially driven policies. These changes and the lack of cutting edge commercially driven R & D have resulted in many of the world's most exciting technologies and innovations being implemented outside the EU.

Specific recommendations:

- The purpose of the CAP must be refocused on commercial agriculture with a research and development, and science based approach to policy formation.
- Reference year based historical payments must be abolished.
- Commercial trialling and registration of GM crops must be realised with a specific focus on input reduction traits in combinable crops.
- Hydrogen power to be supported during its inception to make the technology financially viable prior to next gen cell development.
- Field trials that embrace the true discipline of no-till to be undertaken to evaluate its benefits to Irish agriculture.
- Corporate farming principles and structures to be implemented at farm level to improve access, progression and accountability.
- Margin and return on investment (ROI) farming to be encouraged in place of yield farming.

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