

**AUSTRALIAN NUFFIELD FARMING
SCHOLARS ASSOCIATION**



1998 SCHOLARSHIP REPORT

By

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THE STUDY

When my scholarship was awarded my original intent was to look at seeding any tillage systems and their effect on the soil particularly no-till, the latest developments in fertilizer and chemical application techniques, moisture conservation and any new crops suitable for South Australia.

I quickly came to realise that many of these topics had already been intensively studied by researchers and farmers and I wanted to provide more than just an update.

Therefore, on preparing for my study I asked some farmers and industry people for their thoughts on the challenges facing the South Australian cropping industry and potential solutions that could be gleaned from overseas.

Subsequently, I added several things to my list of study. I would look at no-till from the viewpoint of whole profitability. I would keep my eyes peeled for anything, no matter how outlandish, to help in the control of one of South Australia's worst cropping pests, the white snail. As I am now involved in the export oaten hay industry I planned to look at fodder conservation and all aspects of the timothy grass industry in western Canada and the sudan grass industry in California. Both these commodities compete directly with our oaten hay in the Japanese marketplace.

My objective was to visit as many innovative farmers and manufactures made accessible to my by the Nuffield network and the Nuffield name. I wanted to ensure that my tour extended outside the normal tourism circuit.

After 6 weeks prearranged tour, with the other scholars I was hosted by English scholars for about 2 weeks of study before breaking with Nuffield tradition and returning to Australia for the important job of sowing the crop. I strongly believe that to have continued my study at this time would have been a total dereliction of responsibility to my family. I would like to take this opportunity to thank the Australian Nuffield Association for their flexibility in understanding the needs of cropping farmers.

In hindsight this break gave me a new zest and I attacked the North American leg of my scholarship fully prepared and ready to go.

The North American leg took me from San Francisco to study in Oregon, Washington State, North and South Alberta, Saskatchewan, Manitoba, Ontario, South Dakota, Wyoming, Nebraska, Kansas and Southern California.

I plan to visit Japan to study the oaten hay marketplace in August as a final leg of my scholarship.

In this report I have presented my observations and thoughts on the main areas that I studied and that I believe may impact on the cropping industry in South Australia.

AGROPOLITICS

The main objective of my Nuffield scholarship was to look at new technical advances in agriculture. However, I soon found myself entwined in a spirited agropolitical debate.

In England I was told that in Australia we will never survive without subsidies. That we were doomed to become a casualty of E.U./ U.S. trade wars and end up as peasant farmers feeding a small domestic market.

In Canada the topic of debate was the Canadian wheat board, I had to make my mind up very quickly whether I was a free marketer or in favour of controlled marketing; whether I was a small domestic market.

In Canada the topic of debate was the Canadian wheat board, I had to make my mind up very quickly whether I was a free marketer or in favour of controlled marketing; whether I was a capitalist or a socialist.

In the U.S. I was told that farmers there were not subsidised but had price assurance and land conservation schemes in place. I was also informed that the Australian and Canadian wheat boards were distorting the global wheat price, but who cares because America will win eventually anyway!

After this exposure I have formed my own opinions particularly about government involvement in agriculture.

ENGLAND

Bad weather and commodity prices are not the only major threats to Australian farmer's profitability. From what I saw and heard in the U.K. it can also come from 'strangulation by regulation'. In the U.K. this is already lifting farm costs to levels which could not be sustained without subsidies. I soon found that to be a good farmer in England you had to have excellent people and office skills and be well versed in E.U. policy and government regulation.

The farm office has now grown into a entanglement of red tape and is a check point for a constant stream of auditors from the plethora of government agencies which have developed into the biggest growth industry in England!

English farmers believe that this 'strangulation by regulation' and the high environment standards demanded by the public are a justification for subsidies. This is a very good argument against subsidies to take to our regulators in Australia.

Excessive regulation will increase production costs reducing our ability to compete on the world market. Over regulation could result in government creating a tail spin of regulations and subsidies. In my opinion, excessive regulation/subsidisation cannot be afforded by low population, high export percentage countries like Australia.

FRANCE

After travelling through France it would have been easy to leave Europe with a cocky attitude about our higher levels of efficiency and amused about their reliance on subsidies. However, I was extremely impressed by the way the French have addressed the problem of rural depopulation.

Here we saw one positive social consequence of subsidies. Of the 700,000 farmers in France there are 9000 under the age of 35 entering the industry every year, of which about 10% are from a non-farming background. This has been achieved by providing young farmers with low interest loans and subsidised capital investments. The French have also created a land exchange scheme where older farmers who wish to retire are offered financial incentives to pass their land to incoming young farmers.

Whether these young farmers will ever be viable is another question, but it does illustrate that the French public are willing to pay to keep their rural environment intact.

CANADA

In Canada I saw a good example of government involvement decimating the rural economy. During the late 1800s to encourage expansion of cropping into the isolated prairies, the government of the day instigated a freight subsidy to assist with transportation of grain to the ports. Widely known as the 'crow rate', after the Crow Pass in the Rocky Mountains, the Canadian government paid money to the railroad companies to make the freight charges for the 2000 km trip affordable to farmers competing for exports.

By the 1990s this was costing the Canadian government about \$25 a tonne leaving the farmer to pay \$10. As production increased this subsidy became a heavy burden on the taxpayers and because of W.T.O. pressure the Canadian government withdrew the subsidy in 1995 but paid \$900 million in compensation to farmers.

The combination of low commodity prices and this compensation running out has resulted in the full ramifications of removing this \$25 a tonne subsidy hitting home. In my experience the Western Canadian farmers were the most destitute that I had seen since leaving S.E. Asia.

This 'crow rate' may have been a good idea at the time but sent the wrong message to farmers who then built their industry around bulky export grains and stifled the development of value adding industries.

Now there is a flurry of activity towards high value, freight efficient crops, for example lentils, chickpeas, mustard and durum wheat, with mills and cleaning plants being built in the areas to produce value added products. There has also been a huge increase in pig meat production coming from recently erected, super efficient piggeries which are making use of the more affordable feed grains. Hence the problems of cheap Canadian port entering Australia.

Another more serious consequence of the is government tinkering is the impact on farm equity. The loss of the subsidy has resulted in reduced profitability and reduced land values and slashing farm equity over night. In hindsight subsidies have created as many or more problems than they have cured for those currently farming in Western Canada.

UNITED STATES

I found most farmers in the U.S. to be very patriotic but somewhat frustrated with their government and world affairs. They felt that their decreasing profitability was a result of E.U. subsidies, Canadian and Australian State based marketing organizations and loss of markets due to U.S. trade embargos.

I could have spent my entire study trying to get my head around the farm payment schemes coming out of the U.S.D.A. but this would have achieved very little for me.

I quickly formed the opinion that U.S. subsidies won't stop but will be disguised within a plethora of loan and insurance schemes and land conservation payments.

Where I see it, US farmers will never be competitive in their own right in the world market while they support an over capitalised, over manned and over protected farm input industry. I quickly formed the opinion that the push for subsidies not only comes from the Farm Bureau but also from farm input industries.

The agro-chemical industry stood out as being exceptionally over protected. Tight data protection and patent regulations make it cost prohibitive for generic products to enter the US market. As a result of this, U.S. farmers while having first access to new chemical technology, are paying inflated prices for off-patent products. For example, Roundup is 250% more than in Australia, Ally is 1300% (\$2.1/ha vs \$27/ha) and hormone sprays are mostly double the price.

If U.S. regulations were in place in Australia the chemical bill for my farm would at least double. This led me to investigate the situation in the Australian chemical industry in more detail. Until recently Australia receive the benefit of cheaper off-patent chemicals. This price difference is under threat from the legislation put in place under the National Registration Authority (NRA). For chemicals to be re-registered under the NRA chemical review program companies must present new data about the chemical. If the product is off-patent (worldwide chemical patents last for 17 years) then the production companies have had no financial incentive to do the trial work required to establish this new data. The result would be some off-patent chemicals being lost to Australian farmers.

To over come this problem new data protection legislation has been passed. This prevents open access to new data presented to the NRA allowing holders of new data to on-sell it to other manufacturers. This helps ensure the continued availability of these chemicals but this increase in production cost is likely to make our previously cheap off-patent chemicals more expensive.

WORLD TRADE

I came from Brussels with the standard bewilderment and resentment felt by most unsubsidised farmers. The C.A.P reforms simply mean a money shuffle from the blue box to the green box with appropriate title changes. However, I have to respect the EU taxpayer who appears to be willing to take responsibility for the countryside.

Commonly the EU and US are portrayed as our main competitors on the world market. However, I believe we need to pay equal attention to our fellow Cairns Group members. I view these countries as our real competitors in the efficiency race to produce food at the world price. We can only stay at the front of this race if our inputs can be purchased also at world price.

Currently in Australia we can buy most farm inputs at world price eg. fertilizer, farm fuel, of patent chemicals and finance. The only input that we cannot purchase at world price is labour. This is why many farmers have found themselves on the depreciation treadmill due to being overcapitalised with imported machinery. One of the perceptions of Australian cropping farmers by overseas visitors is we are over capitalised and under staffed.

In conclusion I think it is imperative for Australian farmers to support our Farmers Federation in giving a strong, united voice to our government. Farmers in other countries will continue to be subsidized. It will not cost us anything to be simply organised.

THE G.M.O. DEBATE

We were in Europe at the height of the G.M.O. paranoia. I will not enter into the normal pro's and con's but I would like to add my observations which may put a new slant on the debate.

In Canada I expected to find very happy farmers espousing the agronomic virtues of growing the revolutionary new G.M.O. canolas. I was disappointed to hear reports of reduced gross margins. It would appear the agronomic gains fall short of the costs of the technology. My observation is that all GMO canola has done for farmers is to help in the control of Canadian Thistle and put their markets in jeopardy.

Two types of GMO canola are currently available in Canada. 'Roundup Ready canola varieties released by Monsanto and Liberty Link varieties produced by Agravo, (no Aventis).

To grow a Roundup Ready canola farmers must sign a technology use agreement at a cost of \$40/ha. This gives Monsanto representatives the right to inspect all other canola crops on the farm to check for cross pollution and seed pirating.

Agravo recoup their costs by simply charging extra for their exclusive chemical "Liberty". This acts in a similar way to Paraquat and depending on rate costs approximately \$90/ha. To say the least, there was considerable farmer disgust at these charges.

There is a trickle of Canadian non G.M.O. canola going into Japan being sold at a premium giving a much better gross margin. The market hysteria has filtered into the U.S. Elevator operators are being forced to segregate G.M.O. grains to suit the demands of marketers. This has resulted in a price disparity and could lead to the demise of any further developments in gene technology.

Monsanto has recently closed down its wheat breeding program. The top executives must be sitting in their boardrooms completely flabbergasted at the power of a few huffy journalists in Fleet Street.

In hindsight, I think G.M. technology should have been used first to give consumer benefits eg. increased shelf life, medical benefits, thereby winning their acceptance. Instead the technology was used by chemical companies (who have a poor public image) to give their chemicals greater market share, and farmers have been expected to pick up the tab. The G.M. crops could create their own problems, eg Roundup resistant ryegrass, segregation problems.

I believe that GMO technology has much to offer Australian farmers in the future but only when we have achieved good market acceptance and refined the technologies. It should be remembered that at this stage world demand for food is being more than satisfied with conventional, cheaper plant breeding technologies.

TILAGE AND SEEDING SYSTEMS

Across all the areas that my study took me I say many different seeding systems. These ranged from three point linkage two metre wide drills, following a power harrow, following a mouldboard plough in Europe, to a specially designed hillside drill using crosslot openers in Washington State, to Covervapak and Concord air seeders in Canada to a plethora of corn planters in Nebraska to Greatplains air seeders in Kansas.

The good, most profitable farmers have two main agronomic traits in common. They all have a good rotation (quite often very flexible) coupled with a never ending quest to get the nutrition right. However, their tillage systems range from zero observed in South Australia prior to my scholarship.

This observation might be a disappointment to the avid no-till supporter. However, it is because some of the problems associated with the adoption of no-till can cut into the profitability of the farming systems, eg. increased leaf disease inoculum from stubbles in Europe, lower soil temperatures under trash in Canada, additional chemicals costs in the U.S.

I am not against no-till, it will usually always stand out in erodable and difficult to work soils as the best tillage system. The challenge for us is to make no-till a fail safe and profitable option in a flexible farming system.

THE DAKOTA LAKES RESEARCH FARM

I spent a thought provoking 2 days with the no-till farming systems guru Dwayne Beck at this Pierre South Dakota research farm. He uses a diverse rotation consisting of winter, spring and summer crops. His rotation negates the need for the more expensive herbicides and utilizes the different root systems for disease control and full moisture use.

Dwayne Beck has made a quantum leap forward to no-till and residue management by creating a high output farming systems that could not be achieved with conventional tillage in traditionally marginal rainfall country (14" precipitation). Previously a system such as this was only considered appropriate for the higher rainfall 'Corn Belt'.

One of his missions in life is to develop the perfect zero till seeding system. The seeder he has developed is a triple disc opener which places the seed in two rows 150mm apart with the fertilizer banded between.

His research farm is the Mecca for no tillers in the quest to find the perfect farming system. The farm is also a terrific display of how to spread your work out. With his rotation he has different seeding and harvesting times to use maximum use of machinery and labour.

In my opinion if we adopt the same tillage and high residue levels, including growing cover crops, in our farming system it may be possible to harvest more water and grow summer crops. This would give us better efficiencies of machinery, labour and water use.

GROWTEC EXTENDER

When in Canada I learnt about this new product, yet to be released. It is a plastic coating that can be applied to seed preventing germination until moisture in the soil breaks it down allowing the seed to germinate. This is similar to the concept of plastic coated urea. Extender will be used mainly for the Canadian “Fall seeding” technique whereby canola is sown into near frozen soil in autumn and left to freeze, then germinate in the spring thaw. This results in better yield due to earlier emergence and crop establishment. However this technique has traditionally been risky as the seed can germinate in autumn if the soil does not freeze quickly enough resulting in the death of the seedling over winter. With the application of Extender at projected cost of \$3.00 per kg of seed (\$10-\$15/ha) the seed will stay in the soil for about two weeks without germinating thus giving plenty of time for the freeze.

I can see potential for this product in Australia for canola or maybe even lentils, as it may get cheaper. If the Extender halted germination consistently for two weeks after sowing then we would have time frame to spray a knockdown on weeds that normally emerge with the crop.

GROWTH REGULATORS AND FUNGICIDES

English farmers and agronomists are world leaders in the use of growth regulators and fungicides so while I took the opportunity to learn a bit about them.

The application rates and timing of these chemicals is a science on it's own. Growth regulators had been trailed in South Australia many years ago and dumped because of their high cost and unreliable results. There is however, new interest because of higher production demands pushing higher nutrient inputs thereby creating the problem of crop lodging. The availability of cheap generic products is making the use of growth regulators a feasible proposition. Results are still variable but in the few years we may see a economic response in some crops.

The same story applies to fungicides. In England there is excitement about a new fungicide group called ‘Strobilrins’. These are giving greater yield responses than the traditional Triazole group of fungicides. These Strobilrins are soon to be released in Australia. If nothing else they could make the Triazoles much cheaper, thereby making it feasible to spray for light fungal infections in our lower yielding crops.

FRESNEL LENS

In my constant lookout for a solution to our snail problem I visited Jim Krall at the University of Wyoming. He has done research using a Fresnel lens to sterilise weed seeds.

A Fresnel lens is a specially cut piece of plastic or glass that refracts the light passing though it concentrating it to one area. An example of this is the bed of an overhead projector.

The one used in the experiment was plastic with parallel cuts to refract the sunlight into a narrow band with a mean temperature of 309oC. It was found that surface weed seeds exposed to this for a little as 20 seconds were all sterilised.

The results were impressive but the practicalities of building a large lens for broadacre use, the slow work rate and the fire risk meant a disappointing conclusion for weed seed control.

However, snails may not need as much exposure as weed seeds and the idea could be explored further, especially to kill the eggs that are laid in the soil surface. It could be used in late summer/early autumn on paddocks with insufficient stubbles to carry a fire.

THE CANADIAN TIMOTHY GRASS EXPORT HAY INDUSTRY

In recent years this Canadian industry has blossomed, along with the Australian oaten hay in California sudan grass industries. All three are competing to supply feed to the heavily subsidized bovine industries in Japan.

The Japanese farmers have swung away from imported high protein alfalfa hay to low protein, cheaper, fibrous hay imports. This is because they are able to add protein from the plentiful supplies of home produced meal.

Timothy grass is a perennial grass cut once a year during the Canadian summer. It yields about 5 tonne/ha providing farmers with a good gross margin. A stand last 4-5 years. What I wanted to see was their curing techniques and how farmers managed weather risk.

During the summer in Alberta I was told that a rain could be expected every 3 days and even with a very long day length would make spoilage a certainty. In these conditions it would seem impossible to dry hay down to the 12% moisture required for shipping.

To manage this farmers would recondition the hay windrow immediately after rain to compress the moisture out of stalks and fluff the windrow up again. They would do this anything up to four times. The hay was often baled at a higher moisture content than 12%, taken to the processing plant, teased out and dried with gas fired driers before being processed, normally into the 50kg small bales ready for shipping.

These driers varied in size and capacity but mostly added about \$10-\$20 a tonne to the cost of processing depending on moisture content. This cost could be justified considering the risk of staining making the hay unexportable often halving its value (at the time good hay was about \$140 a tonne).

In northern Alberta I saw experimentation with a Radio Wave Vacuum Dryer traditionally used to dry lumber. This machine works on the same principal as a microwave oven drying a 13 tonne batch of already processed hay from 18% down to 12% in 4 hours at an estimated operating cost of \$15 a tonne. However, at an estimated capital cost of over a \$1 million dollars, this machine has a doubtful future.

There have been some attempts at making in field, mobile gas fired and microwave driers but nothing is commercially available yet.

In Ontario I saw the latest prototype microwave drier which looks promising. This machine is very simple and compact with a projected workrate of 5 tonnes an hour with a 100 kilowatts power requirement. The feasibility will depend on capital cost but this machine is a big improvement on the much romanticized previous prototype.

This microwave technology may also have some potential in the control of snail in South Australia.

HAY MACERATION

One development that did excite me was the hay maceration research done in Canada by the Priarie Agricultural Machinery Institute in Manitoba. This technique is simply extra heavy conditioning using a sequence of rollers which compress the windrow into a thin wafer allowing for very quick drying. It is claimed that with good weather hay can be cut and baled in a little as a day. This would be a vast improvement on ten days which is more the norm in South Australia with export hay.

Deutz in Germany built several pre-production machines that worked well but shelved further development due to a projected lack of demand in Europe because of the swing from away from hay to silage. High power requirements and low workrate were also of some concern.

Variations of these machines are already being trailed on Australian oaten hay. At this stage there has been some success using a large heavy single set of rollers reconditioning the windrow several days after cutting. Tests have shown that with one pass a the optimum time curing time can be halved. This looks to be fast and efficient comprised to the full maceration concept.

ON FARM GRAIN STORAGE

There was one area where the Canadian and U.S. farmers were way ahead of us in South Australia, this is in their professional attitude to on farm grain storage. The advances that are happening in this area was very impressive.

I saw many 'state of the art' silo systems that were used to dry the grain from anything as high as 25% down to 12%. This was using a technique whereby we grain was put into a silo with the whole floor made of mesh. This allowed a high volume of air to be forced up though the grain, gradually cooling and drying it.

These systems, called pressure curing, pressure drying or air drying have been around for years in Canada and the corn belt of the U.S. and have been used in Australia for rice. In silos in Australia similar systems of aeration have been used for insect control.

I was impressed by the way the wheat farmers in Nebraska and Kansas (traditionally in area where grain drying has not been required) where using this pressure curing in increase the quality of their grain to such an extent that it more than paid for the capital and running costs of the system.

They have found that if they harvest their grain approximately two weeks before it is ripe, at the hard dough stage at 20% moisture, and then pressure cure, the grain ripens slower and consistently in the silo. The air is supplied by anything up to three 20 h.p. centrifugal fans for A thousand tonne silo. These will run continuously for anything up to a month to dry the grain down to 12%.

Some of the trials that have been done suggest that the grain comes out of silo is up to 5% heavier in hectolitre weight and 1 to 2% better protein than the same grain if left in the field to ripen naturally. Other advantages are decreased in weather damage by harvesting earlier and that all the grain is sold at the maximum allowable moisture.

I think we could use pressure curing in South Australia for some grains eg; malting barley, durum wheat or lentils, where there is a risk of substantial losses from weather damage and lodging, if we wait until the crop is ripe. However, for normal bread wheats and feed barley it would be nearly impossible to extract the required premiums from grain buyers for improvements in weight and protein to justify the expenses involved.

In the U.S. many domestic buyers will pay for quality on a true sliding scale because the grain is kept on farm and farmer/buyer negotiations are one to one where as here because of our cooperative storage systems where different farmers' grain has to be mixed there is more of a grading system with minimum quality cut-offs, giving no incentive to increase quality.

CONCLUSION

The value of the Nuffield network cannot be understated, the hospitality I received was outstanding. The Nuffield reputation was very evident in England and Canada with people standing to attention whenever Nuffield was mentioned.

One of the best things about the scholarship was the opportunity it gave me to 'chase rainbows' such as the Fresnel lens.

As other scholars have said the scholarship goes on. I now have a new curiosity and now if I want to have a look at something anywhere I will simply get on a plane and go. The scholarship has given me a greater ability to look at things objectively and above all question anything conventional. We will fall into the trap of focussing on our little patch and the scholarship actually made me go to see things of more potential.

The importance of the initial 6 week tour cannot be understated. It gave us all a greater understanding of Nuffield and the much needed confidence to use network as it should be. Without this I would have gone to North America as any other farmer/tourist does and would not have done the scholarship justice.

The English scholars I met were somewhat envious of friendships built on the tour and the experiences of the visiting international scholars.

On a practical note I have already done many public addresses since my return. The irony is that instead of giving these people answers as a result of my study I often leave them pondering questions.