AUSTRALIAN NUFFIELD FARMING
SCHOLARS ASSOCIATION

1996 SCHOLARSHIP REPORT

By

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OBJECTIVES

The objectives of my trip were to study developments in vegetable production, whilst focusing on potatoes and Brassicas. Apart from the technical, practical and business aspects of crop production I also wanted to look at on-farm quality assurance schemes, which are just getting off the ground at home.

I let myself become side tracked by sustainability issues, particularly the practical usage of Integrated Crop Management (ICM), and Decision Support Systems (DSS).

Since I am involved in the Tasmanian export buckwheat industry, I took the opportunity to visit producers and a breeder in North America.

My overall aim was to get as much out of the trip as possible, and I couldn't cram enough in!

INTRODUCTION

We were the lucky first to have had the Asian Experience included in the organised part of the trip. This, I feel, completed the whole trip so well. I had the opportunity to visit some of Australia's most important markets, and then to visit our "competitors" in their various production areas.

My travels took up almost 6 months. The organised tours took us on flying visits through Singapore, Malaysia, Thailand, Brussels, Paris and England, and a few days with my farmer hosts. Thereafter I travelled through vegetable growing areas of England, Scotland, Holland (my country of birth where I refreshed my Dutch), and drove from Idaho through North Dakota, and back through Canada. After 4 months of travelling I met my husband, Tony, in California and together we continued our visits through California, Washington State and Oregon. We flew back to England, Holland and had a quick glimpse at French farming. We then travelled home through Thailand, Hong Kong and China.

One of the great benefits of Nuffield scholarships are that partners are not left out - it was valuable sharing that later part of the trip with Tony.

This has been a wonderful way to travel! Every contact invariably led to several others, and I was amazed at the coincidences and opportunities which came my way. The flexibility that a trip like a Nuffield scholarship gives meant I could take advantage of most of these opportunities.

There is not space enough in this report to cover everything I experienced, so I have divided it into the countries I visited and the aspects which I found most interesting.

BRUSSELS

Our session of lectures in Brussels were "enlightening"! It is hard to imagine how the European Union can satisfy the incredibly differing needs of all 15 member states, and in 11 languages. While we were there the issues were the entry of the Eastern Bloc countries, the introduction of common currency (the Euro), and presenting a unified front for the next round of GATT talks.

The Common Agricultural Policy is a balancing act between incentives to produce, market management, and disincentives to produce. There are minimum prices, quotas, production subsidies, set aside payments, export subsidies, as well as payments for looking after the environment and the aesthetic parts of the countryside. We met farmers in England who would not survive without these subsidies. Their roles appear simply to be "caretakers of the countryside".

There is much speculation that in future agricultural subsidies will become "environmentally linked", and already there is a strong trend in Europe towards farming (and living) in a more environmentally sensitive way. There is a lot of cooperative research between E.U. countries looking at integrated crop production and reducing pesticide usage. In recent news, the strongest push to reduce green house gas emissions came from England.

ENGLAND

The impression of English agriculture which remains with me is that it is incredibly regulated. As well as E.U. regulations, farmers are faced with increasing food safety and environmental pressures which come from an affluent and sophisticated market place.

Many of these pressures are coming from supermarkets which now control 80% of the fresh fruit and vegetable industry. Tesco (18% of market share) recently overtook Sainsbury in the number1 spot. There is fierce competition between the major multiples, and they do whatever they can to get market share. I was stunned to see that quality assurance is going beyond quality and food safety, to complete traceability, and even whole farm environmental management. For farmers to have market access, to simply be able to supply supermarkets, they have to meet the demands placed upon them.

Quality Assurance

Farmers are required by law to keep pesticide records. Spray operators have to be trained and accredited. (In Holland even spray equipment has to be checked and certified every 2 years). "Due diligence" legislation means that farmers must show that they know the risks associated with production procedures, and demonstrate that reasonable precautions have been taken to minimise the risks. "Traceability" of food back to the field it was grown in is increasingly being demanded. Farmers have to keep more and more records. They are becoming very accountable.

Most of the major multiples have joined forces with the National Farmers Union and agronomists to produce Integrated Crop Management (ICM) protocols for every vegetable crop grown. These are best practice guidelines, which are updated every year and beginning to incorporate HACCP (Hazard Analysis Critical Control Point) criteria. They are not yet independently audited, but soon will be. These ICM protocols are increasingly adopting aspects of the "LEAF" scheme (Linking Environment And Farming), which is a voluntary scheme looking at the whole farm, particularly environmental management.

Tesco supermarket has gone out on a limb of its own with its "Nature's Choice" brand. Growers supplying Tesco are very strictly audited, and they have to comply with reduced chemical inputs and environmental management guidelines. It incorporates such things as energy usage, recycling, animal welfare and biodiversity.

When they buy from us, these supermarkets naturally want us to comply with their standards also (although they compromise when there is no alternative). Since returning I've heard that the SQF2000 ("Safe Quality Food 2000") scheme, which seems to be becoming an Australian standard, was very well received by Tesco's buyers in the case of a Western Australian supplier of vegetables. This scheme is now being introduced into Tasmania.

Participation in QA schemes like these is going to become essential in the increasingly competitive world market place. Even Australian supermarkets are beginning to follow the English model, with standards of their own which all suppliers must meet.

I was amazed to see how easily English farmers are taking these extra demands on board. (We were told that the English actually like abiding by regulations). They are professional, quick to adopt new technology, and they pay attention to detail in all their day-to-day operations. There is a lot to learn from English vegetable growing.

Integrated Crop Management (ICM)

This attention to detail is required especially in ICM. ICM is the term given to best farming practice. It involves the whole farm, and in particular focuses on farming in an environmentally sensitive way. For example, it employs the technology available to help in the decision making which ensures that chemicals and fertilisers are applied at optimum times to maximize their efficiency and minimize any negative effects on the environment. It also considers crop rotations, soil management, encouragement of wildlife and beneficial organisms, energy efficiency, and pollution.

English Potato Production

The English potato industry is going through some turmoil as the quota and intervention schemes were dismantled 2 years ago, leading to overproduction and poor prices.

The crisp industry is dominated by Walkers (Pepsico), who deals only with 10 to 12 large growers and are beginning to demand that growers supply a washed product. McCain is a big player in the french fry industry. It has a fixed price contract for 60% of its crop, with the remainder being market related.

The fresh market for potatoes consists of 40% bakers and 60% prepack, including the new trendy salad potatoes which are sold in punnets. Fresh market growers aim to produce an immaculate product for the supermarket trade. The English are very specific about the soil types in which certain cultivars are grown, and its influence on skin finish, particularly if the crop has to be stored.

Seed comes from Holland and Scotland, with Dutch seed often being preferred. Seed is mostly round (whole), it is size graded (and the seed grower paid accordingly), and at planting it is spaced according to size. Many growers *chit* their seed before planting, meaning they carefully *age* the seed to a predetermined number of degree days in purpose built glasshouses, or in farm sheds with artificial lighting. This speeds emergence, increases the number of tubers set (therefore controls tuber size) and also shortens the life of the crop. Very early crops are covered with plastic or a woven mesh during the first few weeks of growth, which further ages the seed.

Seed treatment, especially for fresh market potatoes where skin blemishes are not acceptable, can include a cocktail of chemicals. Its now being suggested to the supermarkets that if they are serious about chemical reduction, then they will have to accept some superficial blemishes.

There are various cup planters available, and again, the English use the technology available to them. Whilst standard wheel centres are 1.8m, some are trying 2 rows on wider moulds, and others 3 rows on a 2 metre wide bed. Both are aimed at improving uniformity of size of crop. The bed system is generally only suited to light soils because of the bulk of soil required to pass through the harvester.

I was interested to see a lot of use made of liquid fertilisers, with the users saying it was slightly more expensive, but easier to handle and it gave a more accurate blend. Where we have granular fertiliser hoppers on our planters, many English farmers carried fertiliser tanks on their front 3 point linkage. (When I later talked about liquid fertilisers with a Californian, he couldn't understand why we weren't using liquid, and *How can you possibly grow a uniform crop with granulated fertiliser?*) Other fertiliser spreading systems in use included auger or air fed booms to apply granular fertiliser; slurry suspensions spread on a paddock as base dressings; dissolved urea topdressed through spray units with modified nozzles by farmers - all aimed at more precise application.

A lot of attention is paid to ensuring that there will no restriction to root growth. Soil is "declodded" before potatoes are planted; at the same time the field is effectively tramlined. There are ongoing studies at the Cambridge University farm and Silsoe College looking at influences of compaction on crop performance, and a lot of use is made of dual wheels or low pressure tyres in Winter and Spring.

Irrigation starts around tuber initiation when a 15-18 mm deficit is maintained for common scab (Streptomyces scabies) control. Again, gun irrigators are generally not considered to be accurate enough, and around 15% of farmers use 50 to 70 meter booms on hard hose irrigators. Irrigation scheduling often uses evaporation figures, with the new development being the Enviroscan - technology originating in Australia. Various trials are looking at drip irrigation, but water has to be very limited or expensive to warrant this.

Russet Burbank, the main cultivar grown in Tasmania, comprises only a small percentage of the English crop - for McDonalds of course. It is considered to be relatively Late Blight (Phytophthora infestans) susceptible. Blight forecasting systems are being developed by consultants who place weather stations in crops, and provide advice based on weather data. These decision support systems (DSS) seem to be more advanced in Dutch potato production.

Harvesting is predominantly using twin-row harvesters, with tractor drawn trailers which then travel on increasingly busy roads. We compared the various systems and were envious of the low prices and 0% interest rates on finance! We came across one large operation which made the change to leasing, not purchasing, all their tractors and harvesters, and made a saving of approximately A$300,000 in repairs and maintenance. They also have the benefit of having up-to-date equipment, with replacements in case of breakdowns. This is attractive to the English machinery firms, because there is a strong market for second hand tractors in Eastern Europe.

Brassicas

Broccoli, cauliflower and Brussels sprouts are huge crops in the UK. Two large production areas I visited were in Lincolnshire and South East Scotland. Some of the most valuable land in Lincolnshire (up to A$35000/ha) is continuously cropped with Brassicas, often with 2 crops per year. pH's are high which keeps clubroot (Plasmodiophora brassicae) under control. Surprisingly very little of this expensive land is irrigated because of Summer rain and saline ground water. However, economic pressures on farmers are forcing those who can to invest in irrigation - to give more reliable yields and quality.

There is a trend towards "baby"/ miniature (10cm diam heads) cauliflower and broccoli, often packed together on a plastic tray, as well as floretted heads ready to put in the pot or microwave. Overall there is a strong trend towards *fresh* and *convenience*.

I found the most interesting aspects of Brassica production in the UK are again aiming better efficiencies with reduced environmental impacts. In frequent use is "Well-N" - computer software developed at Wellesbourne HRI. It aids in recommending nitrogen rates which will minimize leaching, particularly in the 'Nitrate Vulnerable Zones' of England where ground water contamination is a risk. As well as soil nitrate-nitrogen, Well-N takes into account the nitrogen mineralisation of previous crop residues.

Another area of potential use to us is the diamond back cabbage moth (Plutella xylostella) monitoring and control research being conducted and finetuned by Rosemary Collier of Wellesbourne HRI (Horticulture Research International). She is aiming to establish threshold levels at different crop stages, and is working with the various strains of Bacillus thuringiensis as a bio-control agent.

Other Developments

Controlled atmosphere (CA) storage is going to impact on the English market for Tasmanian onions. Four years of research has led to a CA store capacity enabling 7000 tonnes of onions to be stored into the traditional off season "window" for our onions. At present packout of the CA product is 80%. When it reaches 85-90% the costs will be similar to the price paid for Tasmanian onions. So the UK market may be decreasing, but as an importer told me, "*There is always a niche for quality*".

This same importer - a vegetable growing and packing operation - is starting a 5 acre organic vegetable trial at Kirton HRI. Organic farming seems to be taken quite seriously in the UK and Europe, where governments subsidise farmers during the 2 year change-over period. Even the NFU have recently set up a working party to look at organic foods, and the supermarkets are now putting this produce back on their shelves after withdrawing it several years ago because of inferior appearance.

HOLLAND

I'm impressed by what can be achieved in such a tiny but rich country. Holland is smaller than Tasmania and has almost the population of Australia. It claims to be the third largest exporter (in value terms) of agricultural produce in the world, after the USA and France. When I think about what they produce, it is intensive, and much of it is high value or value added. Amongst their most valuable exports are flowers and tomatoes, and Germany is a frequent destination.

The Dutch economy is booming. They pay hefty taxes, but have a generous social welfare system: old age pension at age 65, regardless of assets or other income; unemployment benefits to the value of a previous job; plus a constant stream of immigrants are supported. It seems to be a very tolerant nation.

Supermarkets do not dominate the vegetable market as many of the locals still prefer specialty shops. Albert Hein is the largest supermarket with 28% of market share. It has an association with South American beef producers - why not Australian? It is also the one setting up in Kuala Lumpur. The Dutch are aggressive marketers.

Most vegetables are still sold under the traditional Dutch auction system, and these are now also beginning to demand that vegetables are grown under certain environmental guidelines.

The pressure of a dense population and intensive agriculture on air and water quality (particularly because it is mostly below sea level) has been immense. As a result, in 1989 the Dutch Government decided that "pesticides in arable agriculture and outdoor horticulture must be reduced by 50% by the year 2000".

It is not yet 2000 and it appears that many of these targets have already been reached, and some even exceeded.

The potato industry has set its own targets of an 80% reduction in pesticide usage.

Similar targets have been set for fertiliser inputs and no doubt also for factory and industrial emissions. A Brassica researcher told me of sulphur deficiency in his crops - a new phenomenon which is due to reduced sulphur dioxide - or acid rain. SO2 pollution has been reduced from 80kg/ha to 10kg/ha.

As a result of these policies, agricultural research, backed by Government funding, is heavily biased towards reducing pesticide and fertiliser inputs. Research and demonstration farms have been comparing conventional, integrated and organic farming systems. Recently *conventional* has been dropped from the trials, with the researchers saying that *integrated* is already considered to be the norm. Government policy targets now are for 100% of farmers to be practicing integrated farming by the year 2000.

There is also more emphasis on, and government funding for, organic research. In particular, by using a more scientific approach, the *sustainability* of organic farming is being addressed in what they call *ecological farming*.

The economic viability of organic farming tended to vary with soil type, being more successful on the more recently reclaimed sands than on the older peat soils which contain a lot of weed seeds.

I visited a group of organic farmers who were organised into a production and marketing cooperative, and the most affluent looking Dutch farmer I met was one of these. He was wearing Tasmanian Blundstone boots! His farm was large at 40 hectares, and he claimed his average return was the equivalent of A$10,000 per hectare . Half of his crop was grown under contract to processors. Organic growers get and need a 40% premium here and their main markets are not in Holland, where the demand is still low, but in Germany - particularly the *baby food* market. With larger volumes and better organised transportation and handling it is estimated that only a 10 to 20% premium will be needed. A lot of specialised equipment is now becoming available - especially for mechanical weed control.

These days even hydroponic glasshouse tomatoes can be virtually grown without pesticides. There is a good range of predator insects, whose populations can be controlled in these closed environments. If fungal diseases appear on a leaf fungicide is simply brushed on it, or the whole plant removed if necessary.

Dutch Potato Production

Potato crops comprise 25% of Dutch arable countryside. This is achieved by using incredibly poor rotations; 1 in 2 years for starch potatoes grown in the sandy loams in the North where every square meter is infested with Potato Cyst Nematode (PCN); and 1 in 3 to 5 years for seed and consumption potatoes in the South. Still they are very successful seed exporters!

It was interesting to note that because the Europeans are used to eating yellow flesh potatoes, their french fries are also yellow (The best ones I've ever tasted were in Holland and Belgium!) Even McCain can supply McDonalds with a yellow product. In fact, McCain in Holland grow 40 different potato varieties. Such is the breeding program in Holland that they drop 10 varieties every year and replace them with 10 new ones.

This has helped their chemical reduction targets. A lot of breeding is targeting disease resistance, particularly high partial resistance for PCN, and Late Blight resistance. The variety Bintje makes up 60% of the crop grown, and together with Russet Burbank, these are considered to be the most Late Blight susceptible varieties, requiring the most spraying (up to 16 a year) for this disease. In the months prior to my visit, action groups had put large red banners on supermarket windows saying "Bintje - the Poisonous Potato". Hence a lot of effort is being put into breeding suitable replacements.

For Late Blight control Decision Support Systems are coming into play. Various commercially available programs are being fine tuned and adopted by growers and consultants. For example, neighbouring groups of 5 to 25 growers will share a weather station which they can each access via a modem and the relevant software on their own computer. Hourly temperature, rainfall and humidity data calculate the risk of sporulation and infection. Various other factors, like variety, crop development and blight sources in the area, are taken into account, and then the computer program provides a recommendation, indicating whether or not to spray and which chemical type to use. It also states how and why the recommendations are made. Overall results of this type of system has been more accurate timing of sprays, and often a reduced need for blight spraying.

AMERICA

The wide open spaces of northwest America were a relief to get to after the congestion of Europe and England.

My fondest memories - as well as the spectacular snow covered mountains - are of the Americans themselves. They have incredibly positive attitudes. They seem to encourage and worship success, not knock it. They are also competitive and don't hang back, but try to outdo each other.

Here I had the opportunity to look in detail at potato production in Idaho, Washington State and North Dakota. I also had a quick look at vegetable growing in California, and buckwheat production in North Dakota and Manitoba.

I loved the University research and cooperative extension services, where I had the chance to sit down with some top researchers to discuss all aspects of potato production.

U.S. Potato Production

The potato industry in North America is dominated by the large processors, who are becoming increasingly fussy over their grower choice.

Whilst I was there prices for the last of the stored product were extremely low - because of overproduction. Initially Simplot was offering US$5 /tonne for potatoes for their ethanol plant (interestingly, 10% ethanol mixtures can be found in petrol in Idaho). Finally the government stepped in and gave $15/t for stock feed. Surprisingly, a record acreage was being planted for the next season.

Russet Burbank or similar types are grown for both processing and the fresh market. As a result contracts are available for only a part of the processed crop, the remainder is bought on the open market. The proportion contracted each year varies with the predicted open market prices.

Contract prices are about half ours. Farmers' margins are lean, and they make up for this by planting many acres. Its obvious here that we in Tasmania simply can't compete on price in world markets against these huge scales of production, and that this is where the downward pressure on prices for our commodities is coming from.

For their scales of production, some of the practices surprised and impressed me - they don't cut corners. For example, at planting, moulds are flattened to speed emergence, and rehilled later. This means an extra pass over the paddock, or 40 hectare circle! They tend to have greater pest and disease problems than we do, and often soil is fumigated for Verticillium and nematode control, at great expense. The largest farm we visited had 270 centre pivot circles. Each circle is physically visited twice per week by the farm manager and agronomist. As for Blight spraying, whilst its so easy to put through the centre pivot on those massive acreages, the better growers we met are reverting back to ground rigging (particularly with air assist) because it is more effective. Trials in North Dakota looking at the different application methods also have shown that ground spraying was the best.

As in Europe, Late Blight in America has also developed very aggressive strains which are resistant to Ridomil. Its been a huge problem here in the last 2 years, and costs to control it have increased 3 to 5 fold. Blight forecasting is also moving into the States, with a program called "Wisdom", developed in Wisconsin, being a common one. Many growing areas also have "blight hotlines" over the phone, which are based on programs like Wisdom, and regularly updated by the University extension system.

From a quality assurance point of view - HACCP requirements have been included in growers contracts for the last few years. For example, pesticide records have to be kept, growers have to assure there are no hazardous objects in the soil, and light globes in potato stores have to be protected.

New water rot and pink rot control methods developed by Gary Secor at North Dakota State University are so important to the processors for storage quality that they will pay for part of the chemical costs. Effective control is achieved through applications of Ridomil at early tuber formation stages.

Integrated Pest Management (IPM) is being trialled in Othello in Washington State. We were fortunate to be able to sit in on a meeting with all the parties involved in a trial comparing integrated and conventional systems. The trial consisted of 2 forty hectare centre pivot circles- one with conventional inputs, and the IPM circle with what they called "high management input". The IPM circle is being closely monitored by scientists, and uses all the latest technology including GPS for sampling, and the genetically engineered variety resistant to Colorado Potato Beetle. Advice is given to the farmer, but he still makes the ultimate decision. The trial is being conducted on a Hudderite farm, a very strict religious commune, who are considered to be the best farmers in the district. It is a cooperative research effort between University researchers, processors, fertiliser companies, and even the banks are making their own assessment of the viability of the project.

Precision Farming is quite widely used in the U.S. Fertiliser companies offer soil sampling and variable rate spreading services. They use fertiliser spreaders with 8 compartments (2 for liquid fertiliser), which can spread different blends of 8 nutrients over the paddock, as the soil map dictates. While some say there are definite financial benefits, others say that more years of data is needed. Soil fertility maps do not yet correlate reliably with yield maps.

Genetic engineering is being embraced by the potato industry. Commercially available is Monsanto's Russet Burbank "New Leaf" which is resistant to the devastating Colorado Potato Beetle through the incorporation of a Bacillus thuringiensis gene. In the pipeline is a variety resistant to Leaf Roll virus which is a real problem in parts of Idaho. Whilst food processors in Europe have vowed *not* to use genetically modified organisms in their products, McDonalds in North America have given a verbal approval for the use of Monsanto's variety. There is a lot of support for these varieties which reduce or eliminate the need for chemical spray controls for insects and diseases. However, when it comes to genetically introduced herbicide resistance, the support from many researchers wanes.

BUCKWHEAT in North America

It was fascinating meeting the world's leading buckwheat breeder, Clayton Campbell, in Manitoba, Canada. He works for a private breeding company owned by the Japanese Buckwheat Millers Association and American and Canadian buckwheat growers. What a logical partnership! Clayton has made dramatic changes to the form and flowering habits of buckwheat through perfecting interspecific crossing, by using embryo rescue techniques. He has crossed a wild self pollinating species with the commercial open pollinated species, to help control the characteristics being bred for. Furthermore, many of these characteristics in buckwheat seem to be controlled by only one or two genes, which enables relatively quick changes. His latest work is introducing frost resistance from a wild species, which will be a breakthrough in eliminating the main risk associated with growing buckwheat.

California

What a productive place! California supplies most of the USA and Canada with fresh fruit and vegetables and wines, and then it exports some. A quick trip through, we spent a few days in the Salinas Valley where 24,000 hectares of lettuce are grown for 9 months of the year. It is all harvested and packed in the field by a huge willing and professional farm labour force - the Mexicans - all for around $5 per hour. The town of Salinas exists because of the fresh vegetable trade - it is a cooling and distribution centre. Each day 1500 containers of produce are trucked out of Salinas. During the 3 cooler months of the year (the off season) the whole of Salinas, including all the cooling equipment, literally migrates to the desert in South California.

Amongst other crops, 24,000 hectares of broccoli is also direct sown in the Salinas Valley as a "bread and butter crop". Much of it is exported to Japan and Hong Kong after a 10 day boat journey packed in ice. Modified atmosphere packaging is used for the locally sold product, but not for export.

Whilst food in America is cheap, land values in the Salinas Valley range between $15,000 and $30,000 per acre. With these kinds of costs the trend is to more and more intensive production. Farmers and farm managers are becoming more business orientated, and production is year round wherever possible. Corporate farms have tended to pull out - only Dole is left. Farmers here are either getting bigger, or down stream processing and value adding. Again I was impressed by the people who managed these 400 hectare plus intensive vegetable "ranches" - they seemed so cool, relaxed and in control.

"THE ASIAN EXPERIENCE"

How fortunate we were to have had this part of the world included in the beginning of the Nuffield tour. On our way home Tony and I revisited Thailand, and also stopped in Hong Kong and China. Although only a small amount of time was spent in Asia, it provided the greatest impact. It bombards *all* the senses! Overwhelmingly, the cultures are so foreign, creating barriers which are greater than communication. The people are often so polite. There is an amazing contrast between rich and poor, and the development in the cities has to be seen to be believed.

It has probably changed dramatically since we were there due to economic problems in the region. We had dinner with John Holland Construction people in Kuala Lumpur, which is their base for the whole of Asia. They told us that US$500M *per day* for the next 10 years needs to be spent in the whole of Asia for it to achieve what it plans to. However, they believed the rate of growth was unsustainable and predicted a recession two and a half years hence. This was difficult to comprehend at the time, but their prediction was quite right, only out by 2 years.

60% of Australia's exports go to Asia. This has added 1% to our GDP. However, Australia's share of the market is decreasing due to a changed structure in trade - from rural and mining products to technology, manufacturing and services. Still, 90% of Australia's horticultural exports go to Asia . A strong dependence - given the changed economic circumstances there.

It is also interesting to note that everywhere I went people were gearing up to supply Asia, which I had always thought of as being on *our* doorstep.

Singapore

We had a very informative half day at the Australian High Commission in Singapore, where we were addressed by Austrade, followed by lunch with local business people and importers.

We received an interesting insight into the political and economic system here. Singapore has an 8.5% growth rate with a $12B annual surplus. Its economy is similar to Sydney's. It is reaching a maturity phase and Government policy is aimed at trying to sustain this growth rate. The country is still ruled by Lee Kuan Yew's ego. He doesn't trust market forces, he doesn't trust companies, and he's very single minded towards development. The populace has had to do what it is told and not question, to work hard and be rewarded. Anyone who steps out of line is intimidated publicly. As the political analyst said to us - "Singapore is a shiny example of economic success on the outside, with a rotten core in terms of human rights and democracy". All this has extinguished innovation, and there is now a push to restimulate it through a series of policies to encourage R&D at universities. The government plans up to 30 years in advance - as it can do under such a regime. It wants to become a high tech hub for the whole region. However, the cost of setting up business here is becoming expensive compared to its neighbours. Australia is one of those neighbours.

Whilst Australia has become more competitive over the last 5 to 10 years because of micro economic reforms, I still got the message that, in the case of horticultural products, Australia can be unreliable as a supplier. Our consistency in quality and supply is lacking. We are compared with the Americans - when they get a market, they hold on to it. Apparently Australia was once the sole supplier of lettuce into Singapore, until the Americans got into the market.

Malaysia

The Malaysian part of the trip was organised by Michael Sheehy (WA Nuffield Scholar). Here we received a good insight into the beef market, and the racial tensions which exist between Malaysia's inhabitants. It was Ramadam whilst we were there, and that was an experience in itself! The country is ruled by Muslim Malays who eat beef, which is subsidised. The Chinese are the business people who really run the economy. They eat chicken and fish. The Indians of course don't eat beef. Older Malays prefer to shop in the traditional wet markets, which are purpose built multi storey buildings, with no refrigeration and appalling hygiene. The Chinese and younger generation are increasingly shopping in supermarkets, which will become more common in time with greater affluence. The place for Australian produce is in supermarkets and restaurants. Refrigeration is still relatively uncommon, and needs marketing and education.

A day of lectures at University Pertanian Malaysia near Kuala Lumpur was amusing. Agriculture in Malaysia is actually called a "*sunset industry*". The main agricultural industries are palm oil, rubber and coconuts. Malaysia is 100% self-sufficient in poultry, pork and eggs, but relies on imports to fulfil all other food requirements. Land has been needed for industrialisation and urbanisation, and the labour which used to tend the

plantations has moved to the city for better paid jobs. Still there are thousands of uneconomical "farms" of less than1 hectare.

Trade between Malaysia and its neighbours has opened up and cheaper food is now being sourced from India, Burma and Thailand. Only 2 to 3 years ago Australia was seen as the food basket for this area, but freight is making us uncompetitive in this largely price driven market.

Thailand

….the land of smiles! Buddhism seems to make for a friendly and courteous culture, or perhaps they are very tourist orientated. We visited several temples, and didn't really understand what they were about. We even witnessed a monk being ordained - and there to congratulate him were his wife and child. We learned that all Thai men give up at least 6 months of their life to be a monk.

Thailand *does* have an agricultural industry - and its being protected with 60% tariffs on most imported foods. I found a handful of very expensive Australian vegetables in an immaculate supermarket. We visited a 1000 hectare tomato paste operation which is a joint venture and being managed by a New Zealander. For an operation to be successful here it seems to need outside input. Whilst Austrade gave us a list of potential export products, an Australian importer told us that the best option here is to invest in such ventures.

Hong Kong

We visited this spectacular city just after it was handed back to Chinese rule.

The supermarket shelves seem to be full with Californian produce. An obstacle for us is our airfreight costs, where California can send most produce by sea. An importer told us that in this price driven market, we should aim for the top end of it. He's had trouble with the quality of Tasmanian cherries because of transhipment problems at Tullamarine. However, when it come to carrots, he said that *we* are more market orientated than the Americans. We supply the varieties the customer wants, while the Americans send their surplus and try to compete with sheer volume.

Australia has an 8% share of the fresh vegetable trade, and 6% for fruit.

85% of the locals buy their produce fresh from hawkers or in wet markets which are generally only a 5 minute walk from their tiny (around 45m2) apartments, in which there is often no room for a fridge. However, the supermarket share is increasing. There is not a great price difference between produce in wet and supermarkets here.

China

In China we stayed in a "small" city with 2.5 million people - Zhengshon in Guangdong Province. We had a wonderful host in Ben Quin from the Tasmanian demonstration farm - a man with a passion for sustainability - in a place like China! It is seriously polluted.

This country is in a race to get rich quick, and it seems at all costs. The pollution is going to get a lot worse before it gets better. Its disappointing to see that the petrochemical companies are still exploiting these places, simply because they have no regulations in place. On the other hand they are bending over backwards to give the image of being very responsible to the environment and people in the Western World.

However, the demonstration farm seems to be making some progress in educating the local farmers. Of course, with the communist system in place its easy to make changes, as long as the local government officials can be convinced. People are used to being told what to do. We desperately wanted to ask questions about the political system, but that's taboo!

Farming here is mainly subsistence. Farmers are called peasants. Families produce enough food for themselves, and a bit extra to pay their rent to the local government authority.

There are so many contrasts - people have invested ahead of time and there were many new and empty apartment blocks, while down the road people literally lived in thatched huts. People in the cities drive BMWs while peasants use buffaloes to plough their fields.

Our culinary experiences here were a highlight. We avoided the McDonalds and ate with the locals. Very few people spoke English and the menus were completely incomprehensible! We would choose our fish and poultry from the tanks and cages in front of the restaurant. We could also choose snake, cat, rat, and even dog. Then we'd joke with the staff as we barged into the kitchen to point to the vegetables we wanted. But the final dish always turned out a surprise - usually a pleasant one! And the bowl of tea at the beginning of the meal was not for drinking - but to "sterilise" our eating bowl and chopsticks…..….all a part of that fascinating "Asian Experience"!

CONCLUSION

There are so many rich experiences to be had in travelling the world, so many comparisons to be made, and so much information to exchange. Travel is such a valuable experience for anyone who has the opportunity, and the Nuffield travel experience would have to be amongst the best.

Comparing ourselves with others also makes us appreciate the things we so easily take for granted. We live, and farm, in a great place!

Here its not overcrowded or polluted like so many parts of Asia and Europe. We live in a democracy. Our political system is stable. Our lives are valued - and our personal safety assured. We have a quality of life which is hard to compare to any in the world.

As farmers - we haven't got the environmental and population pressures which Europe has. We're not part of an European Union! We're efficient without needing subsidies. Our land really is cheap compared to most of the developed world. We've got unique quarantine advantages, giving us fewer pests and diseases, and Asia's huge population is still on our doorstep…despite the current economic woes.

The scholarship has enabled me to see for myself just where Tasmania should fit into the global scene. We are perfectly positioned to supply high value, smaller volume and/or value added products to the top end of the market anywhere in the world.

We have many natural advantages over our competitors in the world market place. We can really capitalise on that "clean green" and "wilderness" image, which means *so much* in the sophisticated markets like Europe and Japan.

With the world wide trends towards reduced chemical usage, and the consumers' increasing concerns about the impact of agriculture on the environment - whether real or imagined - we as farmers, need to be proactive in assuring our sound practices, and I believe also in setting best practice guidelines before our supermarkets dictate them to us.

Research here is beginning to target integrated management techniques, and quality assurance is creeping into our farming culture. If backed by integrated management, I strongly feel that quality assurance can give Tasmania in particular a real competitive advantage - because of our many unique attributes! Quality assurance will also progress down the transport chain to make us more reliable as exporters.

Back on the farm, the scholarship is leading to changes in our own farming operations, and allowing us to be more bold in our thinking.