NUFFIELD FARMING SCHOLARSHIP 1997

Integrated Fruit Production
IFP

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CONTENTS

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SECTION 1 - Summary

The Consumer

a) The consumer is king and the world revolves around their wishes and demands.
b) The news media has the ability to influence the consumer by creating hype and fear in food products.
c) Consumers have strong views on food safety, production systems, and environmental issues.
d) Consumers want food to be blemish free, cheap and available all year round.

The Supermarket

a) Supermarkets respond to consumer complaints.
b) They are petrified of bad press and the resulting consumer backlash which inevitably leads to financial disaster for the supermarket chain.
c) Commercial advantage exists where supermarkets initiate and lead consumers to believe they sell safe, quality food, for good value.

The Grower

a) The principles of IFP is the important framework for growers to concentrate on. The detail will vary from region to region and country to country.
b) Growers who are involved with the IFP programme building, review and implementation are the most successful. Those growers where IFP is imposed upon them generally have problems.
c) Growers need to work closely with researchers to develop and have confidence in the detail. Bureaucrats need to keep out of the detail as this can be detrimental and can make the programme unworkable.

Conclusion

IFP is the best response for New Zealand export fruit growers to both consumer trends and environmental concerns. We are very good at producing fruit with low residue, but as the industry moves down the IFP track, there needs to be a greater focus on justification for every action taken.

Consumers must have confidence in the brands that are attached to our fruit **e.g.** ENZA and ZESPRI. These brands must underpin the intrinsic values and enhance the integrity of these value systems. We must work hard to continually improve these growing systems in the future. Sustainable production is not only imperative for profitability but essential to feed the world as the world population expands dramatically into the new millennium.

IFP is only part of a change in world trends. Primary producers are entering a cycle where, if they do not adapt to this changing environment they will be left behind or be completely shut out of entire markets.

SECTION 2 -

BACKGROUND OF INTEGRATED FRUIT PRODUCTIONS

a) **Introduction**

Integrated Fruit Production (IFP) is firstly a response to a changing world driven by consumer awareness flowing back through the sales and marketing chain to the producer of the produce. Secondly with the advent of agri-chemicals earlier this century (to give producers cheaper production costs in the fight against pest and disease), resistance has started to occur to specific pest and diseases in some regions of some countries. Hence the need to find practical and sustainable production methods on a longer term basis. For example quick fix solutions with broad spectrum insecticides has upset the 'balance' within the orchard insect population. Target specific, softer compounds being developed by the large multi-national chemical companies has given rise to an alternative approach. These softer compounds must be used only when necessary.

All of these reasons mean a different approach by growers in the production of their fruit. This is not an organic system. Indeed it could be argued that IFP is more sustainable than organics. Organics has been based on a few selected chemicals including heavy metals like zinc and copper. The toxicity of these products is far greater (100 x) than the new chemistry being developed. This new chemistry is to assist production in a far more subtle way than the ancient products of even a decade ago. Many are derivatives of naturally occurring compounds made artificially.

South Africa, some European countries, USA, Canada and parts of New Zealand have experienced production difficulties with pest and diseases. Consumers around the world were asking and then demanding answers to the safety of the food they were eating.

Here in New Zealand ENZA was being questioned by its customers, particularly in the United Kingdom as to our production systems. This was not about residue levels which we in New Zealand have a very good record in MRL's. It went far deeper.

Dr T A Batchelor the ENZA market access manager was asked to develop methods for New Zealand conditions. In June 1996 ENZA announced its plan to develop "Pipfruit (NZIFP-P)".

b) **Pipfruit (NZIFP-P)**

As defined by ENZA "NZIFP-P is the production of market quality fruit, giving priority to methods that are the safest possible to the environment and human health".

Probably the most significant factor in the immediate future is that NZIFP-P gives preference to non chemical methods of pest and disease control leading to a decrease in agri-chemical use. Inherent in this definition is monitoring for pest and disease presence before deciding if control is necessary and the concept of continual improvement in pest and disease control methods. This aspect is seen in a number of countries around the world in a large number of different crops, often referred to as integrated pest management (IPM). IFP is several steps past IPM with many other aspects of fruit production looked at (**e.g.** Site selection, rootstock, understorey management, water management, fertility etc.) when assessing the environmental integrity of the industry.

c) **My Study**

With the likelihood that IFP would become the dominant production method used in New Zealand in the future, I felt it was important that I looked at the development that had occurred in Europe and USA.

I had enrolled with ENZA to be one of the trial orchardists in 1996 for the initial work. Eighty eight growers had been selected to develop trial work from Hort Research into the commercial approach for all New Zealand's approximately 1600 growers. I had previous experience with the kiwifruit system - Kiwigreen. This is an IPM system rather than the full blown IFP system.

I needed to view commercial growers and how they dealt with the orchard problems through to the supermarkets, the sales 'coal face'. What did the consumer want in our product? The integrity behind the brand they demanded. How were our competitors in other Southern Hemisphere countries dealing with this?

SECTION 3 – Summary

DIARY of EVENTS

Visited

Asia 31/01/99 to 13/02/99	Singapore, Malaysia, Thailand. Nuffield arranged tour. Looked at three Asian countries to gain insight into cultural, religious, ethnic and commercial diversity.
Europe 14/02/97 to 15/03/97	England, Belgium, France. Nuffield arranged tour. Looked at the environmental, trade and political drive inside the EU. Subsidy dependence in the primary sector to support the cultural, historical, social and environmental balance.
South America 16/03/97 to 02/04/97	Chile My study. One of New Zealand's main Southern Hemisphere competitors. How does Chile compare technically, financially and environmentally with New Zealand growers?
North America 03/04/97/to 05/05/97	USA My Study. Visited the main production regions of the West coast of USA. Looked at both pip fruit and berry fruit in conventional, IFP and organic production systems. Compared supermarkets and studied consumer trends. On the East coast visited USDA, and government support for sustainable production. Viewed supermarkets and consumer trends.
Europe Continental 06/05/97/to 24/06/97	France, Germany, Belgium, Italy, Switzerland, Austria, Hungary My Study. Intensive field study of orchardists and research centres dedicated to IFP production in pip fruit, kiwifruit, and berry fruit. Viewed marketing and distributions systems. Studied consumer trends and preferences.
To UK 25/06/97 to 24/07/97	England, Scotland My Study. Supermarket requirements and consumer influence. Research stations and growers of pip fruit and berry fruit. Took time out to enjoy life again with my wife before going back to New Zealand.

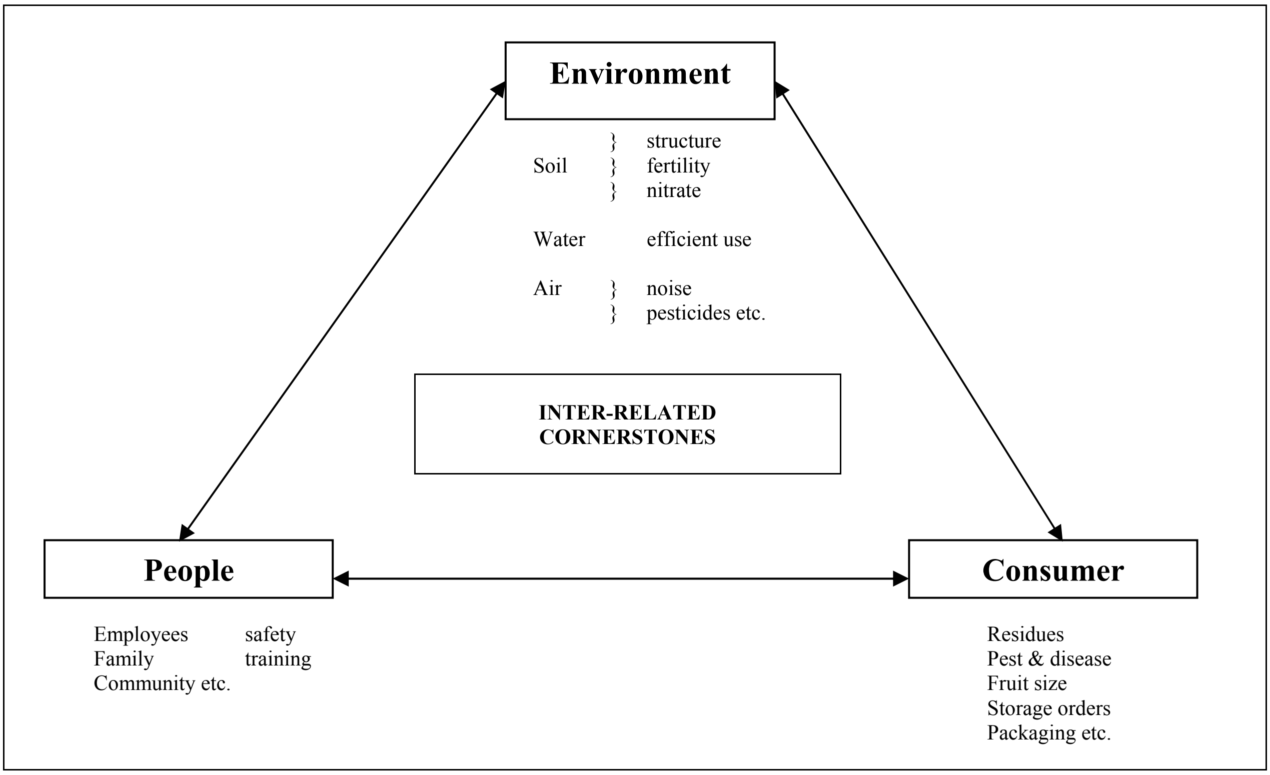
SECTION 4

MY FINDINGS

Any IFP systems must be based on sound IFP principles and framework. Figure 1 diagramatically gives the best principles I saw.

Figure 1

IFP Principles



Development of guidelines for IFP follows on from the principles. Generally these would incorporate the following:

1) Definition and principles.
2) Professionally trained, environmentally and safety conscious growers.
3) Conserving the orchard environment and perhaps enhancing where possible the bio diversity.
4) Site selection to encompass the right rootstock, cultivar and planting systems.
5) Soil management and tree nutrition.
6) Alleyway and understorey management
7) Efficient use of water through irrigation application and monitoring
8) Tree training and management
9) Crop loading and management
10) Pest and disease control by using naturally occurring parasitism and only using the softest, targeted pesticide when well researched thresholds had been breached.
11) Efficient and safe spray application methods.
12) Harvest, packing, packaging and storage of the fruit.
13) Post harvest treatments.
14) Mode of application, controls, auditing, certification and labelling.

European countries, regions, researchers, supermarkets and growers have given IFP a lot of thought. It is now widely adopted with approximately 40% of production now under IFP or related production systems as seen in figure 2.

Figure 2

National areas of pome fruit production, regional or national organisations operating and areas and numbers of growers implementing IFP or related QA schemes in 1994

Country	Total area of	Total no.of pome	Area of pome fruit production (ha)		No. of pome fruit growers	
	pome fruit (ha)	fruit growers	Total	IFP/QA	Total	IFP/QA
Austria	5.831	2,720	5,831	4,765	2,720	1,398
Belgium	20,000	1,600	20,000	4,510	1,600	500
Denmark	3,444	625	3,444	962	625	104
France	75,000	14,104	477	477	130	130
Germany	38,558	17,500	38,378	30,441	17,836	4,677
Great Britain	17,000	700	13,000	13,000	550	540
Italy	71,237	?	71,237	37,981	38,308	17,948
Netherlands	21,000	3,000	21,000	14,800	3,000	1,700
Norway	2,300	?	2,300	200	111	?
Portugal	25,500	24,000	1,100	1,100	130	130
Spain	56,000	11,200	319	319	40	40
Switzerland	6,080	4,500	6,080	4,347	4,500	1,764
Total	**341,950**	**79,949**	**183,166**	**112,902**	**69,550**	**28,932**

Problems do exist with some of these systems particularly where political and poorly researched answers have been forced. I saw abuse of some of the new chemistry which will rapidly see resistance to these compounds. I saw first hand at both Novatis and BASF the huge cost that went into this new chemistry. Novatis spends NZ$3 billion a year testing 200,000 potential new products.

The compounds go through rigorous testing involving thousands of scientists in laboratories, glasshouses and field trials. This process can take years of work before registration can take place. Commercial use of compounds may only result in one or two commercial products from 200,000 initial compounds. Some of these new products are mind blowing in how they work to protect our produce.

It therefore seems such a waste of time and resources where bureaucratic officials overule sound scientific evidence. Growers too can induce resistance problems where sensible use is not observed. In most countries scientific panels have been set up to monitor chemical sensitivity and resistance.

Figure 3

People Diagram resistance management

Generally though government and the EU are very supportive of their countries producers with help in the form of ($) subsidies and other in direct resources. Examples of national organisations which assist producers are Agrifuturo in Spain, FIP in Germany, LEAF in Great Britain and Odling i Balans in Sweden.

Even the United States (the home of capitalism), support its producers to make their production systems sustainable. United States Department of Agriculture (USDA) has a dedicated team who assist with technical information and working commercial forms that are used to give producers confidence to change to more sustainable practises.

Supermarkets have seen IFP systems fill a need to give their customers confidence to shop in their stores. This is graphically shown particularly in the UK with Sainsbury and Tescos. They have developed their own versions of IFP to overcome food safety issues, traceability etc. which gives them commercial advantages. Tesco has launched "Natures Choice' and Sainsbury has developed its own integrated crop management system (ICMS). Both supermarket chains prominently display their standards that producers must comply with to supply food to their stores.

Figure 4

INTEGRATED CROP MANAGEMENT SYSTEMS

The Integrated Crop Management System (ICMS), developed by Sainsbury's supermarkets, uses biological and natural methods for selective control of pests and diseases.

ICMS employs,

- Forecasting and monitoring techniques
- Crop rotation
- Disease and pest resistant varieties
- Staff training to minimise the use of pesticides

Pesticides are used only when necessary are targeted against specific pests or diseases with localised treatments where possible

We have been working in partnership with suppliers since 1992 to develop crop protocols specific t individual crops. We introduced a policy to reinforce their application in 1992.

Suppliers work together in crop groups with technologists and buyers. For UK crops, we are working with the National Farmers Union and a partnership of other large retailers to ensure conformity of industry-wide codes.

ICMS is a long-term strategy covering all crops grown in the UK and 31% of overseas produce (representing 53% of all our produce) is grown to ICMS protocols. The latest application of our policy is to frozen foods and baby foods.

Sainsbury's supermarkets is also working to extend the scope of ICMS to the concept of whole farm conservation and not just individual crops.

These standards are strictly adhered to and audited regularly. I thought to the point of being ridiculous. I vividly remember visiting a pig farmer in Yorkshire (as part of the Nuffield organised tour). He explained that when his supermarket official audited his system they went all the way back to the boiler operators certificate to make sure he was licensed, to operate the boiler, to heat the mash, to feed the pigs. I failed to see the absolute importance placed on the boiler operations certificate. But once you have a system, that must be the system.

This to me is extreme but I can understand the bad press and the damage it can do to a supermarket or a line of food products. There would not have been a day go by when there wasn't a prominent article in one of the daily newspapers about a food safety issue. In the USA there was berry fruit (strawberries and raspberries imported form Mexico and Guatemala) which had caused E Coli or similar poisoning in the USA. This also resulted in a backlash for local growers. The flow on effects to other producers is a real concern.

Likewise in Europe, BSE in cattle, salmonella in eggs, and E Coli in sausages. There was also an outbreak of Newcastle's disease in chickens. This only effects chickens but it unnerves the public because they don't know what is safe to consume.

The public can be very distrustful of producers and their practises. They want food to be safe and look at it with nostalgic imagery. Why couldn't it be like the old days? At the same time they want it blemish free, cheap and available all year round.

To some consumers organic delivers trust. These consumers are willing to pay much higher prices for this assurance. The vast majority of consumers however, want cheaper produce with the guarantee that it is safe. This is the dilema that ENZA has been in. It knows that our residue levels are low, but to satisfy the other intrinsic values customers are looking for it can't be guaranteed until IFP becomes adopted by 100% of its suppliers.

I spoke with hundreds of customers in supermarkets around the world as they purchased fruit and vegetables. I asked them such things as 'Why did you pick that one?' 'What is wrong with this one?' 'Why do you shop here?' 'Have you bought this product before?' and 'Why don't you try this one?'

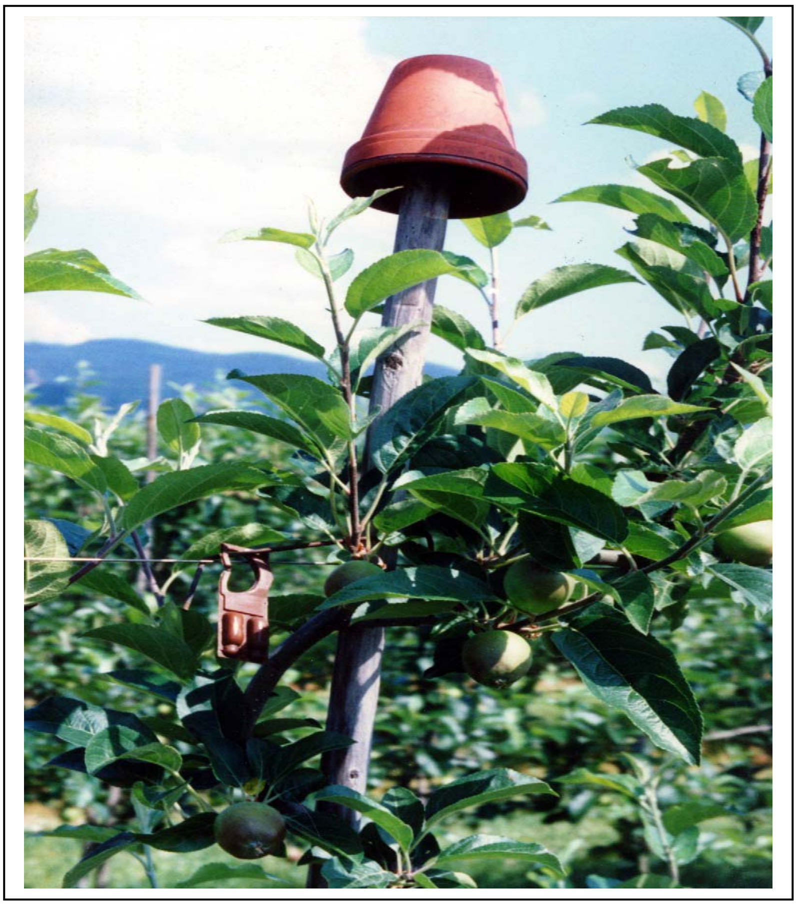
Invariably they told me their choices were based on environmental health concerns. These concerns are responded to by sophisticated complaints systems in all the main supermarket chains and so the systems are perpetuated.

New Zealand growers by in large are not exposed to this directly like the European growers. As 90% plus of our Class I production is exported to the other side of the world, ENZA is relied upon to give market feedback. ENZA has been slow to see the trend in the late 1980's and early 1990's. However, New Zealand growers have made up for lost time. A big advantage of the single desk is that once a policy is decided upon it is possible to implement massive changes like IFP relatively quickly. It will be possible for New Zealand's entire production within a few years to be produced under IFP. In Europe however, IFP was started in 1980 by French producers in the Loire valley and similarly in Bolzano by Italian growers. I don't believe either of these two regions will have their entire production under IFP before New Zealand .

This is despite the fact I found continental European producers to have a greater technical awareness of both pest and disease life cycles, as well as being conscious of the environmental issues consumers focus on. Continental European producers had developed good monitoring systems for their particular problems.

These included:

1) Pheromone mating disruption strips and ties
2) Pheromone trapping and recording
3) Companion planting and beneficial insect enhancement
4) Nesting boxes for specific bird species
5) Field scouting and recording
6) A blackspot spore sniffer
7) Computer modelling linked to climate data recorders
8) Flowerpot technology
   As shown in the photo to the right. This allows predator insects protection from the elements and any insecticide chemicals applied.



Other good examples of responses to environmental concerns included:

1) Breeding programmes to breed cultivators resistant to either pest or disease.
2) Multi tractor use – mowing and crop spraying in one pass for better utilisation of equipment, less energy consumption and less soil compaction.
3) Sophisticated mechanical weed control.
4) Infra red sensors to operate weed sprayer. Spray is emitted only when weeds are electronically sensed.
5) New generation chemistry
6) Varietal and rootstock selection.
7) Spray container recycling
8) Improved sprayer and application techniques
9) Bunding of fuel tanks to prevent spillage into the environment.

European producers, scientists and government officials have come together to try and formalise many of these initiatives. They have tried to incorporate them into guidelines common to all, with government officials seeing the opportunity to formulate standard regulations for Europe.

The first gathering was in 1991, the second in 1993 and the third in 1994. They represented 14 European countries. A series of publications resulted. The final guide known as the "Guidelines for Integrated Production off Pome Fruits in Europe" technical guide III. Unfortunately this hasn't been as successful as anticipated. Growers haven't felt part of the system and the statistics show where it has fallen down.

Figure 5

Country	IFP/QA	Non-Compliance of guidelines with Euro-guidelines			
	Organisation	Anti oxidant	Residual herbicide	Growth regulator	Others
Austria	National				
Belgium	Flanders GAWI (Walloon)		√ √	√ √	
Denmark	National				
France	Covapi				
Germany	Baden-Wurttemberg Bayern Brandenburg Hessen Mccklenburg-Vorpommern Niederelbe Rheinland Rheinland-Pfalz Sachsen Sachsen-Anhalt Schleswig-Holstein Sudoldenburg Thuringen Westfalen-Lippe		√ √ √ √ √ √ √ √ √ √ √ √ √ √		)))))) a maximum of) 4 dithiocarbamate) fungicide) applications) is permitted))))
Great Britain	GRO-ACT	√	√	√	p.h. fungicide permitted
Italy	Emilia-Romangna Valtellina (Lombardy) S Tyrol Trentino Veneto	√ √ √			) > 3 dithiocarbamate) fungicide applicaatoins) permitted. Acaricides) permitted with restrictions) S. Tyrol
Netherlands	MTB		√	/	Soil sterilisation permitted
Norway	National		√		
Portugal	APAS AVAPI				
Spain	Catalonia (1995)	√			> 3 dithiocarbamate fungicide applicatons permitted
Switzerland	MS/SOV		√ √		

Although this result has been disappointing for some it proves that the detail belongs to individual regions in individual countries. They have to go back to IFP principles and framework. If they are sound then the scientists and growers need to build up the detail together.

New Zealand has been successful by doing just that. Firstly under Dr Tom Batchelor (and now under Graham Hull) assisted by scientists and growers, we have collectively been able to build a strong and robust IFP system that is uniquely New Zealand. This will satisfy our customers, environmental and local communities concerns.

SECTION 5

OTHER OVERSEAS OBSERVATIONS

As you can see from section 3, I visited many countries. From the acknowledgements I met many people ranging from trade and government officials to producers and consumers.

I couldn't help but develop many macro and micro observations. I have listed some of these in no particular order below.

1) Protection of the fabric of rural society

- depopulation
- subsidies v's stewardship payments

In New Zealand we cut labour input to make our production systems more cost efficient. What will be the long term effects of this?

2) Environmental protection of the rural habitat

- soil, water, air quality
- bio diversity
- effluent disposal rural and urban, different approaches used
- the effects of intensive production long term
- nitrate and phosphate leaching, soil denigration

3) Agricultural image

- hardworking, long hours
- difficult to attract new people and ideas
- low returns, low pay
- average age of the rural workforce/ownership increasing

4) Supermarket power

- dominated by supermarkets to the point of exploitation of the producers (semi-monopolistic)
- who will protect the fragmented producers?

5) Branding/marketing

- strong branding to promote an image
- commodities v's niche branding/marketing
- different brands fulfil different customer needs
- the consumer is different from the customer for producers and manufacturers The consumers message is sometimes changed or blacked by our customer.

6) Food safety and quality assurance systems

- continual media attention on unsafe food
    - BSE – beef
    - E Coli – sausages, berry fruit
    - Salmonelia – eggs
- traceability development back to the producer
- producer guarantees, IFP and similar

7) Reduced pesticides

- IFP
- organic movement
- consumer expectation and imagery

8) Genetic Engineering Gene mapping

- speeding up the breeding process v's the introduction of completely different species characteristic
- emotion v's facts

9) Animal Rights

- housing stock because of environmental problems – cold winters, hot summers
- housing space per animal
- tailing/docking of animals
- chemical, drug experimentation
- blood sports

10) Business Protocol

- Asian v's European business philosophy

11) Land fragmentation/use

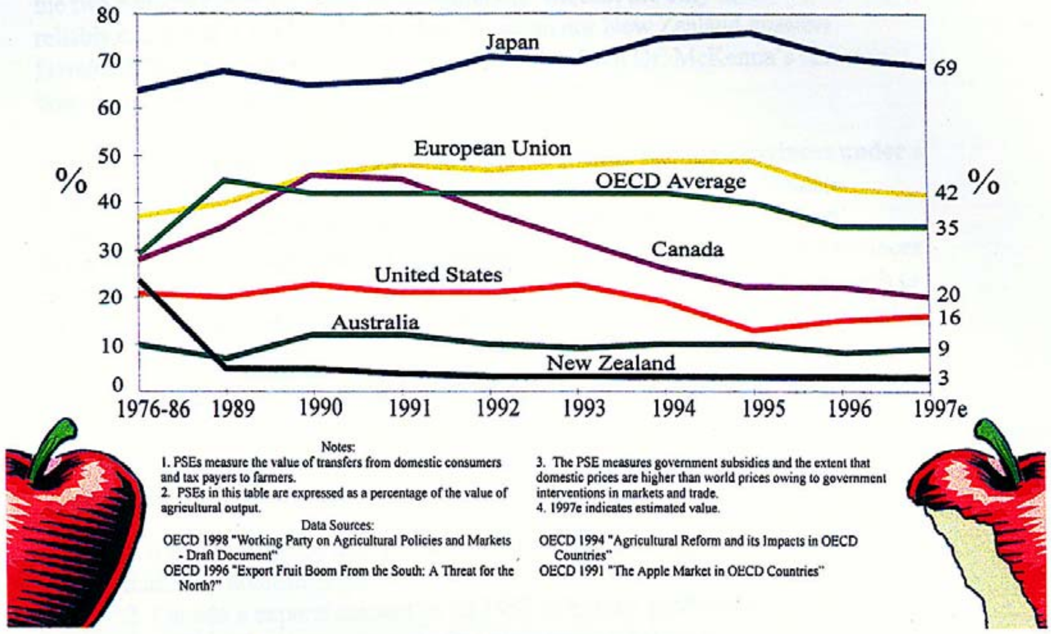
- the best land ends up under houses
- Where producers can no longer make money from production, carving the land into lifestyle blocks for one house, three sheep and a view seems to be the next option
- Large scale production is pushed further back on more fragile soil types

12) International trade

- subsidies
- trade barriers

I wish to comment in more detail on international agricultural trade which we still depend on. New Zealand at present seems to be hell bent on leading the world at all cost. We are definitely way out in front with the lowest level of subsidies (these subsidies are only on New Zealand research) and tariff and non-tariff barriers.

Figure 3 Producer Subsidy Equivalents, OECD (1976-1997)



Notes:
1. PSEs measure the value of transfers from domestic consumers and tax payers to farmers.
2. PSEs in this table are expressed as a percentage of the value of agricultural output.
3. The PSE measures government subsidies and the extent that domestic prices are higher than world prices owing to government interventions in markets and trade.
4. 1997e indicates estimated value.

Data Sources:
OECD 1998 "Working Party on Agricultural Policies and Markets - Draft Document"
OECD 1996 "Export Fruit Boom From the South: A Threat for the North?"
OECD 1994 "Agricultural Reform and its Impacts in OECD Countries"
OECD 1991 "The Apple Market in OECD Countries"

What I observed is that while we should definitely assist in levelling up the playing field of world agriculture trade we shouldn't get so far out in front that we loose sight of the nearest followers.

We should also be weary of putting ourselves up as the whiter than white example for fear of both annoying countries of our holier than thou philosophy or receive the 'so what' attitude.

I saw many examples within countries where they were going to make agricultural production work no matter what the cost. Their reasoning included they wished to protect the rural fabric of society, nostalgic, cheaper than the social cost, votes, environmental stewartship, sentiment, strong rural lobbying, statis, inter country rivalry, trade leverage or just didn't want to be dependant on other countries for all of their food or particular food group/s.

The world of agricultural trade is very complicated, diverse and the playing field is far from level.

New Zealand needs to assist in the freeing up of world trade which will be in our best interest long term. However, this will not occur overnight and in some instances very little progress will be made because of the political ramifications for countries, politicians and officials

Food is different from industrial goods because of the amount of emotion that goes with it. Logical, economic monetary policy and principles appear to go out the window when it comes to food.

New Zealand producers should be and generally are market driven. Competition most of the time drives cost out of business but purist competition leads to only winners and losers. The trick for New Zealand is to have a very competitive but also co-operative agricultural industry. This will not only maximise New Zealand producers income but also New Zealand's.

SECTION 6

IMPACT of NUFFIELD ON ME

Changes Nuffield has had on my life and farming practices:

1) Complete change in our apple production. All of our properties are now under IFP.

2) I have been involved with Hort Research and Heinz Wattie in developing a programme for berry fruit – boysenberries. Initially we have focused on insecticide reduction and replacing the hard products with the "softer" new products that are more target specific. This year a wider focus with fungicides will be looked at. Other principles will follow from IPM.

3) On my return I have travelled widely through New Zealand giving over thirty presentations to grower groups on various aspects of IFP.

4) I have provided ENZA and Hort Research with detailed information on many IFP systems I observed overseas.

5) I have been elected chairman of Nelson Regional IFP committee. I have helped change the focus from the first eighty eight experimental IFP growers to the commercial uptake by the general body of New Zealand pip fruit growers. I have represented growers at a national level on the National Task force run by ENZA.

6) I am now looking at our dairying practises on our home farm to make them more sustainable.

7) The range of experiences I encountered overseas will be beneficial for the rest of my life. I am sure the investment made in me by Nuffield will be repaid to the primary sector many times over.

Acknowledgement and thank you to the following people and organisations:

1) New Zealand Nuffield Farming Trust

2) The primary industry sponsors of New Zealand Nuffield

3) Nuffield scholars visited world-wide

4) Wai-West Horticulture Ltd - New Zealand

5) Compass Fruit Ltd - New Zealand

6) Fruitfed Supplies Ltd - New Zealand

7) Novatis - New Zealand/Switzerland

8) BASF - New Zealand/Germany

9) ENZA Fruit International – management/staff – world-wide

10) ZEUS management/staff – Chile

11) Oppenhiemer staff – USA

12) Zespri staff – world-wide

13) Christophe Aubineau and family – France

14) John and Sally Palmer - New Zealand

15) Angus and Beata Davison – UK/Hungary

16) Tim Sobey & Cilla Clive – UK

17) Tradenz – Thailand

18) Austrade – Singapore

19) Heytsbury – Australia/Malaysia

20) Kurt Wert – Italy

21) Wayne and Kathy Salii – USA

22) Michael Fitzner USDA-USA

And the many orchardists, farmers, processors, packers, marketers, buyers, supermarkets, researchers and government officials I visited who gave up their valuable time to assist me.

Finally a special thanks to my family and staff that kept things running smoothly while I was away for the six months.