"THE POTENTIAL FOR COMMERCIAL ORGANIC SHEEP FARMING IN THE SOUTH ISLAND"

Allan Richardson
Kellogs Scholar 1997

Contents

1.0 Executive Summary

The organics industry in New Zealand is experiencing rapid growth with $20 million of organic products exported in the year to June 1997, a 67% increase on the year before. Kiwifruit and processed vegetables from Heinz Watties are the major earners.[1]

The demand for organic food produce in the USA, the largest single market, is growing at 23% per annum compared to 3% for conventional food produce.[2] There are major opportunities for New Zealand to capitalise on this consumer demand for clean organic food.

The New Zealand organic livestock industry is small and fragmented. There are 60 - 70 organic certified and uncertified sheep and beef farmers in New Zealand. There are two independent certified groups in New Zealand which register farmers under the BIO-GRO and Demeter labels.

New Zealand has two organic livestock research farms at Winchmore near Ashburton and at Ballantrae near Palmerston North. Stock production after the initial two year conversion period required for BIO-GRO certification compares favourably with conventional production levels. Selection of worm resistant sheep, herbal pasture mixes and specialist forage crops high in protein will help to minimise production losses in young sheep.

Organic sheep farming compares favourably with conventional sheep farming on a financial basis. The organic stock production was 93% and 84% of conventional production based on per stock unit and a per hectare basis. To match conventional farming on a per stock unit basis would require a 7.5% premium for meat or a 20% premium for wool.

There is a small and static domestic demand for organic meat products attracting around a 15% premium. Many organic growers sell their produce through conventional channels. Individuals who have developed export markets for their organic lamb and beef are achieving premiums up to 120% for lamb and 300% for beef in the high value restaurant trade.[3]

One of the four South Island meat companies processes small quantities of organic lamb and beef. The general consensus is that at present there is not a consistent international demand for organic meats. There would also be problems sourcing the quality and quantity of stock demanded for export markets.

The supply and demand for organic wool is less clear. The associated problems of farming sheep without dipping for lice or flystrike can be overcome but most wool is sold through conventional markets. There are some companies interested in sourcing organic wool from Europe and the USA.

The potential for commercial organic sheep farming in the South Island rests with exporting organic certified lamb into the high value, zero quota, niche markets of Asia and the USA. Premiums for organic wool in Europe and the USA markets would be a bonus. The demand for organic meat products far exceeds the supply from existing farmers and will continue to, until top conventional farmers take up the challenge of farming organically.

Ultimately it may be the consumers with their growing concerns about food safety, animal welfare and quality issues that will hold the key for growth of the South Island organic sheep farming industry.

2.0 Introduction

2.1 What Are Organic Products

"New Zealand is in a unique position to capitalise on the world demand for clean food."

Dr Tony O'Reilly
Chairman of Heinz Group of Companies
March 1997

Interest in reducing or farming without chemicals is gaining momentum in New Zealand due to several factors:

- Increasing world wide demand for low residue and organic produce presents New Zealand with an ideal opportunity to supply these markets.
- Preference by consumers for sustainable farm practises and higher levels of animal welfare.
- Possibility of non tariff barriers due to high residue levels in our products.
- Increasing resistance to anthelmintics, insecticides and herbicides.
- Increasing withholding periods placed on livestock following internal / external parasite treatments.

What are organic products?

These are products which reach the customer as natural as possible.

This means little or no processing and no synthetic fertilisers, hormones, pesticides or chemical treatment agents.

2.2 Organic Producer Groups

To have a product labelled "Certified Organic" in New Zealand requires strict adherence to a quality assurance programme.

There are two independent certified groups in New Zealand that operate internationally recognised and respected programmes:

1. New Zealand Biological Producers and Consumers Council administers the BIO-GRO label.
   - 800 members
   - 300 primary producers and processors

2. Bio Dynamic Farming and Gardening Association in New Zealand administers the "Demeter New Zealand" label.
   - 50 licensed members

2.3 Size of New Zealand Organics Industry

In the year ending June 1997 the Organic Products Exporters Group (OPEG) exported $20 million of organic products. This was up 67% on last year's production. Expectations are that organic exports will reach $60 million in the next two years. Japan was the destination for 77.5%, Europe 10.3%, USA 7.4% and Australia 4.4%.[4] Contrast this with the deer industry which took 20 years to reach $100 million in export earnings and currently earns $220 million.[5] New Zealand's total agricultural exports are worth over $10.3 billion.

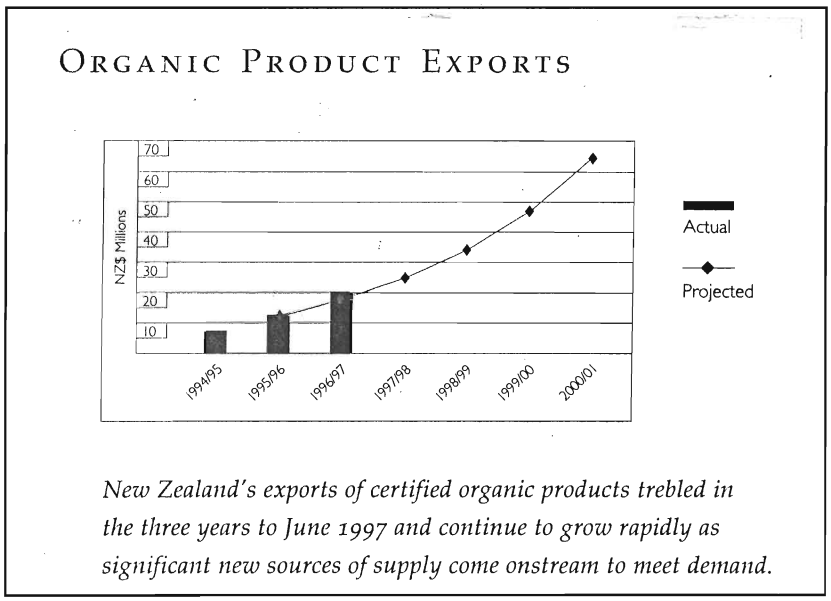
OPEG was formed with the support of Tradenz (New Zealand Trade Development Board) in response to growing international demand for credible sources of organic produce. OPEG is a network of businesses, scientific institutions, government agencies and the two independent certifying organisations BIO-GRO and Demeter. It has 33 members currently and was established in late 1995.

The products consist mainly of Kiwifruit marketed by Zespri International and processed frozen vegetables for the Heinz Watties Group. In 1996 580,000 trays of Kiwifruit were organically produced out of a total 64 million trays. Watties frozen foods have contracted 50 growers to supply organic vegetables.[7] Squash, honey, meat and wool products are also exported by OPEG members.

Land area certified for organic production at the end of 1994 was 11,500 hectares. Accurate figures of the expanding current area are not available. [7]

On the national scene there are a growing number of specialist organic retail outlets including four in Christchurch who stock a wide range of organic certified or "natural" foods, which has been grown by local producers. [36]

2.3.1 Graph - New Zealand Organic Product Exports [1]



New Zealand's exports of certified organic products trebled in the three years to June 1997 and continue to grow rapidly as significant new sources of supply come onstream to meet demand.

2.4 The International Organic Situation

The majority of developed countries are well ahead of New Zealand with their organics industry.

ORGANIC FOOD SALES [2]

USA	- Sales of $3 billion
	- Growth of 23% per annum
Britain	- Sales of $264 million
	- Growth of 10% per annum
Europe	- 1.4 million hectares
	- Farmed organically by 44,000 farmers

COUNTRIES FARMING ORGANICALLY [17]

Country	**% of Land Area Farmed Organically (ha)**
New Zealand	< 0.1%
UK	0.3%
France	0.3%
Italy	1.2%
Denmark	1.5%
Germany	1.8%
Sweden	3.3%
Austria	10.9%

2.4.1 Survey on Buying Organically Grown Agriculture Produce [2]

The MAFF (Japanese Ministry of Agriculture, Forestry and Fisheries) conducted a survey in November 1995 which focused on consumers purchase patterns of organically grown agricultural produce. Of those surveyed:

- 2.0% purchased organics daily
- 5.8% purchased 3 - 4 times a week
- 21.6% purchased once or twice a week
- 36.0% purchased at some time in the past but not recently

Reasons for purchasing organics:

- 80.0% listed food safety

Retail prices of organic food:

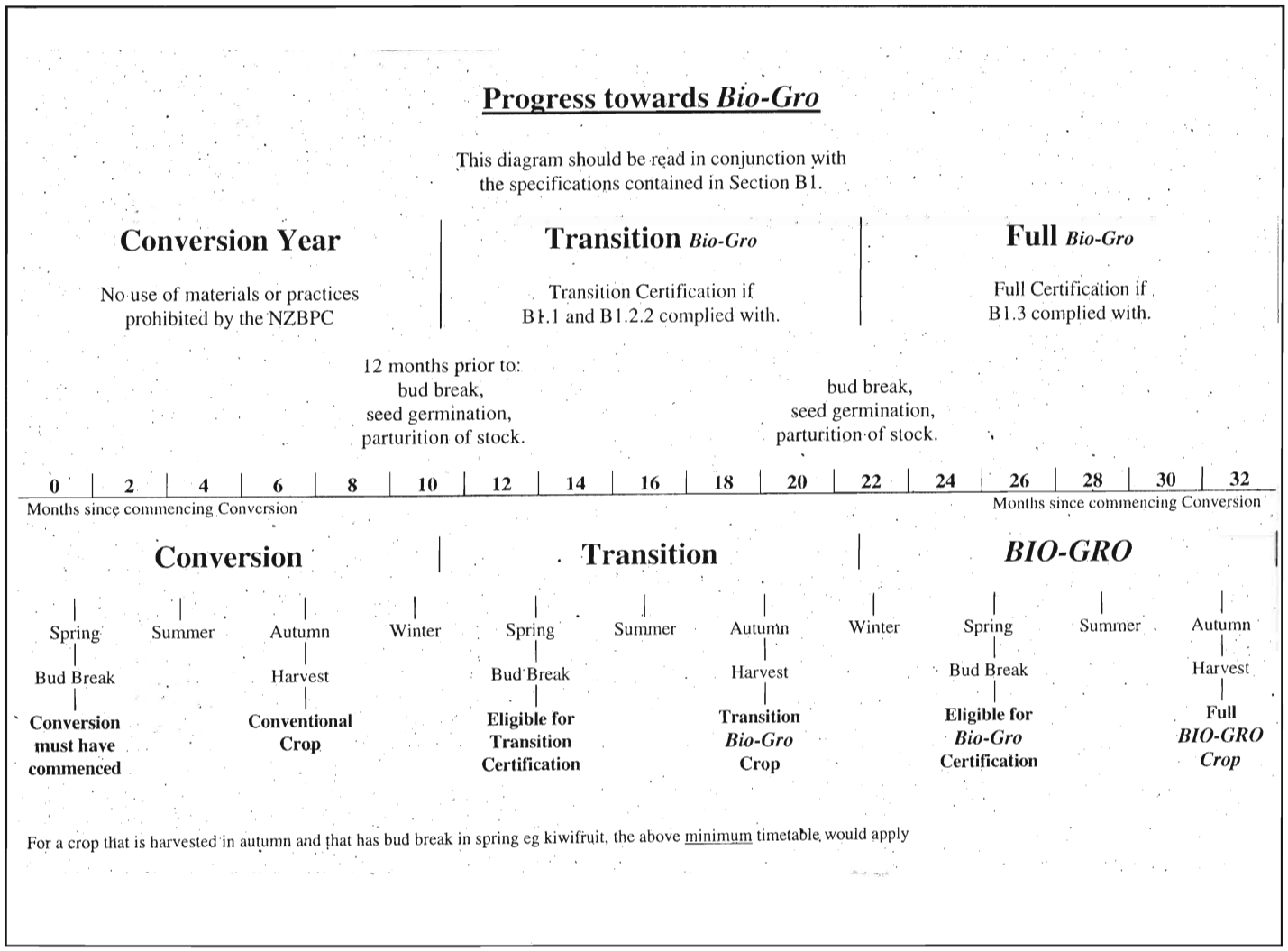
- 80.0% of consumers felt organic products prices were higher than average prices for conventional products.
- 60.0% of consumers stated they would buy organic vegetables if the difference in price was less than 20%.

2.5 BIO-GRO Principles [18]

BIO-GRO New Zealand has a set of "Certified Organic" production standards. The detail the procedures permitted, moving from conventional to organic farming. This is normally a two year period during which no prohibited materials or activities have occurred on the property. The conversion period starts in the spring with crop sown, lambing or calving. It is only in year three that the farmer can market his produce under the BIO-GRO label and benefit from any premiums.

A pre-requisite of registration is that the testing of soils for residues of 2,4-D 2,4,5-T and DDT and their metabolites.

The BIO-GRO Council permissible levels are based on 10% of the maximum levels listed in the New Zealand Food Regulations (1992). For example DDT levels must not exceed 0.2 mg/kg compared to 2 m/kg allowable under the New Zealand Food Regulations for dairy farming.[18]



2.5.1 Partial Conversion

Because of financial constraints during the conversion period, a proportion of the farm may be converted. This is a means of facilitating and encouraging the conversion of the whole property within a set period of time.

2.6 Organic Farming Principles

The object of sustainability lies at the heart of organic farming and is one of the major factors determining the acceptability or otherwise of specific production practices.

The term organic should not be referred to just type of inputs used but to the concept of the farm as a living organism with all the component parts, the soil minerals, organic matter, micro-organisms, insects, plants and animals interacting to create a sustainable, natural resource.

Key Characteristics

1. Protecting the long term fertility of soils by maintaining organic matter levels and encouraging soil biological activity.

2. Providing crop nutrients indirectly which are made available to the plant by the action of soil micro-organisms.

3. Weed, disease and pest control relying on crop rotations, natural predators, diversity, resistant varieties and limited biological and chemical intervention.

4. Use of livestock species which complement the farm management practises of crop, pasture, weed and parasite control.

2.7 Organic Livestock Farming

The use of sheep and cattle on organic farms is seen as desirable and beneficial for both species. They play an important role in nutrient and energy cycling. They can also contribute to weed, pest and disease control through grazing and winter feed conservation.

Because the use of chemicals on organic farms is not an option under normal conditions, farmers have adapted their management strategies to combat this.

2.7.1 Organic Sheep Farming

Sheep would not normally be farmed organically without cattle but for the purpose of this report the production, financial processing and marketing opportunities for sheep will only be considered.

2.7.2 Organic Beef Farming

A three year trial at AgResearch Winchmore on the effect that introducing cattle has on reducing internal parasites of sheep found:

1. Increased pasture cover from 2.7 to 3.2t DM/ha.
2. Increased lamb carcass weights from 16.7 kg to 19.2 kg.
3. Reduced parasite larvae numbers by 80%.
4. Had no effect on internal parasites of lambs.[8]

Lambs on the cattle system grew faster as a consequence of improved feed supply. The benefits of using cattle to provide "safe pasture" are debatable in the short term. In Canterbury six months of cattle grazing still left a high parasite challenge for newly weaned lambs. When the period was extended to nine months the parasite challenge was minimal.[10]

Cattle take 18 months to reach full immunity to internal parasites compared to sheep which take on average nine months.[9] A major disadvantage for organic cattle farming is that no group is selecting for parasite resistance in cattle unlike in the sheep industry.

2.8 Breeds of Sheep

All breeds of sheep appear to be represented on organic farms in New Zealand. Research involving resistance to internal parasites has shown that Perendales are 50% to 70% naturally more resistant to internal parasites than Romneys and Coopworths. Further research suggests Texels are also more resistant.[19]

AgResearch has selection lines for internal parasite resistance and resilience with the later being evaluated at Ballantrae. Resilient progeny have shown an advantage in liveweight gain over unselected sires only on the organic farm. [24]

Organic farmer Tim Gow from Western Southland, successfully farms two sheep breeds. The German White Headed Marsh is a white faced dual purpose sheep breed. The Wiltshire sheep appears to be the ideal terminal sire. Scientific research in Australia and England proved the Wiltshire to be the most parasite and fly resistant breed with high meat yields. These sheep breeds have high natural immunity to disease and parasites.[21]

The success of organic sheep farming will depend on using breeds of sheep which have proven natural immunity to parasites while still maintaining top levels of production in an organic livestock system.

2.9 Size of Organic Sheep Industry in New Zealand [22]

One estimation is there are 60 - 70 organic certified and uncertified sheep and beef farmers in New Zealand producing up to 10,000 lambs in both the North and South Islands. A more realistic figure of export quality lamb is probably half that figure in both islands. There are only 10 registered BIO-GRO farmers in the South Island listed as producing sheep and beef products.

2.10 Organic Livestock Research Farms

There are two sponsored livestock units farmed organically in New Zealand. There was a third but the Flock House organic unit was closed due to a lack of funding.

- AgResearch's Winchmore Research Station near Ashburton sponsored by MRDC.
- AgResearch's Ballantrae Hill Country Research Station near Palmerston North sponsored by Foundation of Research Science and Technology (FORST).

The production levels achieved on these research farmlets gives some confidence about the ability to farm organically. There is some promising research taking place on improved genetics, internal and external parasites, pasture species and weed control.

However the real test is whether there results can be matched on a large scale commercially farmed unit.

The success and production levels of these farms will be discussed in Section 3.

3.0 Production

The three fundamental questions to ask regarding production on organic livestock systems are:

1. What are the levels of production compared to conventional livestock systems?
2. How do you control livestock disease, weed and pests when farming organically?
3. Is organic farming sustainable?

3.1 Production Levels on Research Farms

There are two AgResearch organically farmed livestock units in New Zealand.

1. **AgResearch's Winchmore Research Station** [25]
   - Situated near Ashburton on flat irrigated land
   - Funded by Meat Research Development Council
   - 20 ha farmlet farmed organically for last eight years
   - Full BIO-GRO status
   - Sheep to cattle ratio - 60:40
   - Stocking rate 14.4 su/ha
   - Breed own sheep replacements
   - Cattle brought in as weaners

   Production
   - 135% lambs tailed (Coopworth flock)
   - 15.7 kg average carcass weight
   - 4.5% death rate in sheep

2. **AgResearch's "Ballantrae" Hill Country Research Station** [26]
   - Situated 35km east of Palmerston North
   - Full BIO-GRO status established in 1991
   - Funded by NZ Foundation for Research Science and Technology
   - 2 self contained 25 ha farmlets
     - 1 farmed conventionally
     - 1 farmed organically (chemical free)
   - Sheep to cattle ratio - 65:35
   - Stocking rate 12 su/ha
   - Fertiliser in the form of reactive phosphate rock and elemental sulphur is applied to each farmlet at the same rate.

3.2 Production at Ballantrae [24]

- Lambing percentages are similar on each farmlet. Romney flock.
- Calving percentages are similar on each farmlet
  Range between 90% - 100% over four years

3.2.1 Lambing Performance

	Conventional	Chemical Free	Difference
1991	105	103	- 2
1992	87	89	+ 2
1993	110	110	-
1994	101	111	+ 10
1995	107	108	+ 1

3.2.2 Wool Production 5 Year Average

Greasy Flc Weight Fleece Only	Conventional	Chemical Free	Difference
Ewe lambs	0.66	0.67	+ 0.01
Ewe hoggets	2.27	1.85	- 0.42
2th ewes	2.21	2.25	+ 0.04
MA ewes	3.29	3.18	- 0.11

3.2.3 Mean Liveweight (kg) of Sheep and Cattle - April 1992, 93, 94, 95

	Conventional	Chemical Free	Difference (kg)
Ewe hoggets	33.0	27.1	- 5.9
2th ewes	51.7	51.6	- 0.1
MA ewes	55.6	54.4	- 1.2
R1yr steers, heifers	217	213	- 4.0
R2yr steers	390	366	- 24
R2yr heifers	376	361	- 15
R3yr steers	543	525	- 18
MA cows	465	479	+ 14

3.2.4 Stock Deaths Over 5 Year Period

	1991/92		1992/93		1993/94		1994/95		1995/96	
	Con	CF	Con	CF	Con	CF	Con	CF	Con	CF
% MA ewe deaths	4	8	2	3	7	7	3	2	4	2
Ewe hoggets	2	6	2	12	0	2	0	0	0	0
Recovery drenching in chemical free farmlet (CF)										
Ewe hoggets %		24		12		6		4		14
R1yr cattle %		50		0		0		13		0

Notes:
The total stock units for both the Winchmore and Ballantrae organic farmlets is 290 stock units and 300 stock units respectively. Small changes in numbers or deaths reflect large percentage changes. What is really important are the trends between the conventional and organic systems and also over the trial period.

3.2.5 Animal Health

Stock on the conventional farmlet at Ballantrae received a standard health programme. Lambs were drenched five times from December weaning to May in their first year.

Stock on the organic farmlet received no drenches apart from a recovery drench if necessary in which case they were culled. No vaccines, dips or antibiotics were used.

3.2.6 Lamb Growth Rates at Winchmore and Ballantrae

Both research farms identified reductions in lamb growth rates from weaning December / January until May in the first year.

All lambs regardless of their susceptibility or resistance to internal parasites must be exposed to infected larvae before they develop a natural immunity. Resistant lambs will develop this immunity more quickly but this still reduces lamb growth rates in the post weaning stage, compared to animals which are drenched.

	Growth Rate g/day	
Lambs	**Con**	**Chemical Free**
<u>Winchmore</u>		
Up to weaning (early Dec)	250g	250g
Mid Dec to mid Jan	150g	150g
End Jan to early May	150g	90g
<u>Ballantrae</u>		
Up to weaning (Dec)	230g	210g
Jan to May	139g	115g

By the 2th stage there is very little difference in sheep liveweight between the conventional or organic units. The sheep in the organic block catch up due to compensatory growth from the ewe hogget to 2th stage.

3.3 Control of Livestock Disease, Weeds and Pests

3.3.1 Organic Farming

The routine use of drenches, vaccines, antibiotics, dips and other chemical remedies is prohibited in the BIO-GRO standards. It can only be used if an individual animal is suffering or showing signs of ill-thrift.

At Ballantrae the need to administer recovery drenches declined over the first three years of the conversion period. In the first year 24% of ewe hoggets required one drench whereas two years later only 6% required a recovery drench. This suggest that changes are taking place in the organic system to compensate for the removal of anthelmintic drenching.

Stock deaths on both research farms are not significantly different between the conventional and organic units.

3.3.2 Internal Parasite Control

Selection programmes such as the WormFEC Service are identifying animals with natural resistance to internal parasites while still having high growth rates and wool production

The benefits of this system are:

1. Resistant lambs become immune to parasite challenge earlier than susceptible lambs which will minimise losses in liveweight from post weaning to one year of age.

2. Resistant stock reduce the levels of larval contamination on the pasture therefore reducing liveweight and production losses of susceptible stock under a zero drenching regime.

3. There is widespread drench resistance to white, clear and now combined drenches leaving only Ivomectic drench in some cases.

Table 1: Ovine FECR case submissions in 1995: Prevalence of resistance according to drench type [28]

	Benzimidazole		**Levamisole / Morantel**		**Milbemycin / Avermectin**		**Benzimidazone-levamisole combination**	
	No of tests	*% resistant*	*No of tests*	*% resistant*	*No of tests*	*% resistant*	*No of tests*	*% resistant*
NI	20	75	12	25	3	0	5	0
SI	22	77*	16	38*	9	0	7	29*
NZ	42	76	28	32	12	0	12	17

NI = North Island, SI = South Island, NZ = New Zealand

3.3.3 Parasite Management Techniques

The integration of parasite management strategies for sustainable internal parasite control such as cross grazing cattle and sheep, use of clean pasture areas, new pasture varieties and better nutrition will reduce the liveweight losses of post weaning lambs.

Ewes receiving a high plane of nutrition have three times less worm burden at lambing time than those on a low plane of nutrition. There was no significant effect between energy supply and FEC levels but a higher protein level gave significantly lower FEC levels.[11]

A study at Flock House found that under conditions of marginal nutrition, low levels of parasitism may have a greater effect on production than under high levels of nutrition.[29]

3.3.4 Pasture Mixes

Because 95% of sheep internal parasites are located on the pasture, attention has turned to pasture species which can limit larval populations.

- Highest numbers of larvae recovered on:
  Yorkshire Fog, Ryegrass, Cocksfoot species

- Intermediate number:
  Browntop, Tall Fescue, Prairie Grass species

- Lowest numbers:
  White Clover, Lucerne, Chicory species [29]

At AgResearch Winchmore replacing a typical Ryegrass White Clover pasture with a multi species mix consisting of Tall Fescue, Grazing Brome, Prairie Grass, Phalaris, Timothy, Plantain, Chicory, White and Red Clover with Lucerne had the following effects:

1. Reduced mean pasture cover from 2.8 to 2.5t DM/ha.
2. Increased winter feed deficit from 54 to 70 kg DM/su.
3. Increased carcass weights from 15.6 to 17.5 kg.
4. No effect on parasite larvae or adult numbers.[8]

Use of a herbal ley has considerable merit on organic farms. It requires replacing some of the traditional grasses such as Ryegrass with herbs. The herbs enhance the health of livestock and also add a distinctive flavour to the meat. Herbs used include mint, chicory, yarrow, sheeps burnet, plaintain, thyme and comfrey.[3]

3.3.5 Specialist Crops [29]

A range of forage crops which contain condensed tannins (CT) such as Sulla, Maku Lotus and Goldie Lotus have been shown to substantially increase parasitised lamb growth performance and reduce dagginess associated with parasitism.

These crops have very high protein levels which lead to increased protein availability for the animal, allowing the animal to minimise energy losses due to parasitism.

These crops must be grown as specialist crops and more research is taking place to improve their persistence.

3.3.6 Organic Control Methods for Lice

Lice control in sheep under an organic chemical free farming system is difficult but it can be managed.

Management practices such as six month shearing in February and pre-lamb in August as well as maintaining high nutrition levels during the peak lice winter period, minimise the lice problem.

A naturally occurring organic pyrethroid can be used on a restricted basis to dip sheep with. By restricted, the use of the pyrethroid needs written approval from the BIO-GRO council. It shouldn't be used on an annual basis.[18]

Within a mob of sheep there will be a wide variation in the population of lice on each sheep. Some individuals will have very few lice and won't be affected by them. The possibility of breeding sheep that have some natural resistance to lice needs to be studied further.[25]

It has also been observed that animals with a high level of resistance to internal parasites appear to be less affected by external parasites such as lice. This is based on observation and as yet no scientific studies have been carried out. [25] [26]

3.3.6.1 Lice Control at Winchmore and Ballantrae

Sheep at both Winchmore and Ballantrae are not dipped for lice control. Their production is similar to that on the conventional farm. There is some rubbing by the sheep over the late winter period. This stops once they have been shorn.

3.3.7 Research Into Lice Control [12]

1. Research scientist Allen Heath of AgResearch Wallaceville states that the winter period is the time when lice numbers peak. Shearing reduces the level by up to 80%.

2. In a trial on an organic sheep farm freshly shorn ewes were plunge dipped in water mixed with detergent. This resulted in a 95% reduction in the lice population.

3. For lice to move from one animal to another takes close contact for one to five minutes. One lousy sheep took 18 months to infest 20% of an unaffected flock in trial work carried out in Australia.

4. A study between Landcare, Otago Regional Council and WRONZ on the effectiveness of dipping operations in the Clutha District found the following:

"Of the nine properties taking part, not one of the experienced farmers had sufficient chemical in solution at the time of sampling to adequately treat for lice."

5. There is widespread insecticide resistance to the organophosphorus compounds diazinon and propetamphos throughout the North Island and the top of the South Island in trial work done by Allen Heath.

3.3.7.1 Lower Residue Wool Demanded By Overseas Markets

The Wools of NZ initiative to reduce dip residues in our national wool clip has been driven by demands from our overseas markets. The voluntary 60 day minimum withholding period is likely to become mandatory in the future as we strive to get wool down from the current 10 ppm averages to 5 ppm of dip residue in our wool.

It is no longer a legal requirement to dip sheep every year. Many farmers could dip every second year and still maintain good lice control. [12] In parts of Australia farmers have established lice free zones by following a two year intensive dipping programme. [14]

Market pressure on conventional farming practices such as dipping is likely to increase as consumers demand higher standards of food and environmental safety.

3.3.8 Flystrike

Less flystrike on the organic system at Winchmore has been recorded than the conventionally farmed area. Up to 5% of stock can be affected with individual animals treated conventionally and then 1% - 2% removed from the trial area. Flystrike is treated with a water jet and dagging.

AgResearch has released an Integrated Pest Management system (IPM) which involves trapping flies in August and September which have over wintered. During the spring and early summer lab bred parasitoid wasps are released on the property to control fly numbers. Covering of dead animals also reduces the likelihood of flystrike. Maintaining high levels of nutrition and dagging will also help to reduce flystrike levels.

In Gisborne the IPM technique has reduced flystrike in lambs by 60% both by killing flies and acting as surrogate sheep distracting attention from the real flock.[12]

3.3.9 Vaccinations

No vaccinations are carried out at either research station. Pulpy Kidney has been identified at Winchmore but lamb deaths are not significantly higher. Where there is a history of clostridial disease permission can be given by a BIO-GRO inspector, provided they are used only until acceptable alternatives are available.

Scabby mouth vaccinations are allowed with written approval from BIO-GRO.

3.3.10 Control of Gorse

This is the major weed problem at Ballantrae and indeed the potential would exist in any hill or poorer class of country.

Bio control agents such as gorse spider mite and thrips offer limited control. Grubbing of seedlings is achieving good control.

3.3.11 Thistles

California Thistles present the main challenge on the Winchmore organic farmlet. These are partially controlled with topping and grazing management. Nodding Thistles are grubbed.

In 1996 Landcare Research suggested a two-pronged attack against thistles. The crown weevil and a gall fly. The gall fly attacks up to 95% of seed heads and reduces seed production by 60%.

The sclerotinea rust attacks the thistles roots but is only available for experimental use at this stage.

3.3.12 Barley Grass [31]

The introduction of Phalaris into pasture mixes results in the more aggressive phalaris choking out the barley plants. However a light sowing rate of ½ kg/ha is advised to minimise phalaris poisoning the stock.

3.3.13 Biological Control Methods

Thistles, Ragwort, Argentine Stem Weevil and Gorse to a lessor extent are now being controlled with natural predators, potentially saving New Zealand farmers millions of dollars. Argentine Stem Weevil causes $100 million damage each year to pastures and crops. [16] Rabbits are now being controlled in many parts of the South Island by the RCD virus, which was introduced this year.

The Oregon Department of Agriculture claimed for every $US1 invested in biological control $US13 was returned through reduced livestock losses, reduced herbicide use and increased pasture productivity. [35]

Research into controlling parasite larvae on the pasture has centred around using fungi which consume the larvae in dung deposits before they hatch. A commercial fungus administered through a lick is almost ready for release in Australia. [20]

3.4 Is Organic Farming Sustainable?

The entire basis for eliminating disease in plants and animals is the fertility of the soil. Organic farming relies on the principle of restoring the soil's ability to process nutrients and make them available to the plant and animal. It does not mean a no input regime.

Fertiliser inputs such as rock phosphate, elemental sulphur, dolomite and lime are acceptable in the organic farming system. There are now commercially available seaweed and fish based products which supply both macro and trace elements.

The first two years of the conversion from conventional to organic livestock farming are the hardest financially and physically. The soil, plants and animals all have to adapt to a chemical free state. While stocking rates have been reduced by around 20% initially, these rates have in many cases been increased as the soil micro-organisms start to recycle and release nutrients for plants and animals.

Watties pea growers are producing more off organic farms than they were on traditional farms but it has taken three to four years to achieve this.[5] Gisborne organic pea growers are paid more than double the price for their crops by Heinz Watties than growers of conventionally grown peas.[6]

3.5 Is Conventional Farming Sustainable?

The question could be asked, are our conventional farming systems sustainable in the long run?

It is estimated that approximately 30% of New Zealand's sheep and wool production is dependent on the use of anthelmintics. In economic terms that equals $950 million of sheep products being supported by the use of $30 million of anthelmintics.[29]

Information presented at the seminar on Sustainable Control of Internal Ruminants at Lincoln in June 1997 confirmed the problem of widespread drench resistance and also resistance to organophosphate sheep dips.

There is recorded drench resistance to every drench family including avermectin in New Zealand. Some goats already have avermectin resistance and they have successfully transferred this resistance to lambs under trial conditions. There have been no on farm recorded cases of sheep being resistant to the avermectin family yet. [37]

Anthelmintic Resistance % [20]				
Country	**Benzimidazole**	**Levamisole**	**Combination**	**Avermectin**
Paraguay	73	68	-	73
Brazil	90	84	73	13
Argentina	40	22	11	6
Uraguay	86	70	-	1.2

On the world scene South American countries with 100m sheep and 23m goats have no chemical options left to control internal parasites. South Africa has large areas which cannot be farmed with sheep. The southern states of America have high levels of resistance. All EU countries report increasing levels of resistance. 80% of farmers in Australia have drench resistance. [20]

The development of integrated control systems for the management of internal and external parasites will certainly extend the life of existing drenches and dip families, in conventional farming. New technology such as the controlled release anthelmintics has given farmers another tool to fight internal parasites but there is already resistance recorded to these capsules in Australia. They were released onto the market 14 years ago. [13]

4.0 Financial

4.1 Financial Comparison of Conventional Versus Organic Sheep Farming

In an effort to give a financial comparison between conventional sheep farming and organic sheep farming, the differences in production levels and costs which have been documented at Winchmore and Ballantrae will be used.

4.2 Budget

For this exercise separate budgets will be calculated for the conventional and organic sheep farms.

Farm details:

- 200 ha Southland plains farm
- Breeding own replacements
- Fattening all prime lambs
- Swedes gown for winter feed
- Pasture renewal at 5% of total area per annum

Production Parameters	**Conventional**	**Organic**
Lambing SS	125	125
Average lamb carcass weight (kg)	16	15
Wool Production:		
Ewes	5	4.9
Hoggets	4	3.5
Stocking rate su / ha	15	13.5
Death rate %	3	4

Capital Stock Wintered	**Conventional**		**Organic**	
	No's	**su**	**No's**	**su**
Breeding ewes	2,000 @ 1	2,000	1,800 @ 1	1,800
2ths	550 @ 1	550	495 @ 1	495
Ewe hoggets	600 @ 0.7	420	540 @ 0.7	378
Rams and killers	40 @ 0.8	32	36 @ 0.8	28
	3,190	3,002	2,871	2,701

Returns

Meat: 16kg PM Southland average net price $44.54
15kg PM Southland average net price $42.32
Freezer ewe @ $26 / head net

Wool: $3.00 / kg net

Assumptions Made	**Conventional**	**Organic**
Shearing	No lambs shorn	No lambs shorn
Shearing	12 month	2 @ 6 months for ewes
Fertiliser	375kg superphosphate @ $152	250kg rock phosphate @ $220/t
		20kg elemental sulphur @ $352
Animal health:		
Drenching ewes	1 @ pre lamb	
lambs	5 drench programme	10% of lambs recovery drench
Dipping	Contract	10% recovery dip organic pyrethroid
Vaccination	5:1 vaccine	-
Pasture renewal	5% of total area	5% of total area
Winter feed (swedes)	10 ha	10 ha
Cultivation	Contract 20 ha	Contract 20 ha
Cartage of stock	100 km	100 km
Weed and pest, thistles	20ha @ $75/ha spray applied	40ha topped @ $25/ha
Total lambs	3,187	2,869
Works lambs total	2,569	2,308
Cull ewes	470	400
Wool production	15,390 kg	13,351 kg

Expenditure such as lime and pasture renewal which would be similar on both farms have been left out of the budget calculations. Prices and costs are from Lincoln University Budget Manual 1997.

Budget	**Conventional**		**Organic**	
Income				
Works lambs	2,569 @ $44.54	$114,423	2,308 @ $42.32	$ 97,674
Cull ewes	470 @ $26.00	12,200	400 @ $26.00	10,400
Wool: Ewes	12,750 kg @ $3/kg	38,250	11,245 kg @ $3/kg	33,735
Hoggets	2,400 kg @ $3/kg	7,200	1,890 kg @ $3/kg	5,670
Rams	240 kg @ $3/kg	720	216 kg @ $3/kg	648
Total Wool kg	15,390 kg		13,351 kg	
Total Income		172,793		148,127
Expenditure				
Shearing	3,190 @ $185/100	5,901	5,166 @ $185/100	9,557
Crutching	2,550 @ $65/100	1,657		-
Animal Health:				
- Drench Ewes	2,550 @ $0.06	153		-
- Drench Lambs	12,000 @ $0.04	480	230 doses @ $0.04	9
- Vaccination Ewes	2,550 @ $0.42	1,071		-
- Vaccination Hoggets	600 @ $0.34	204		-
- Dipping	3,150 @ $0.85	2,677	270 @ $1	270
Fertiliser:- cost	75 t @ $152/t	11,400	50 t @ $202/t	10,100
			4 t @ $352/t	1,408
- application	75 t @ $22.50/t	1,687	54 t @ $25/t	1,350
Weed & Pest, Thistles	20 ha @ $75/ha	1,500	40 ha @ $25/ha	1,000
Cartage: - Lambs	2,569 @ $1.80	4,624	2,308 @ $1.80	4,154
- Ewes	510 @ $1.50	765	460 @ $1.50	690
- Wool	81 bales @ $12	972	70 bales @ $12	840
Ram Purchase	6 @ $490	2,940	6 @ $640	3,840
Total Farm Working Expenditure		36,031		33,218
PROFIT / LOSS		$136,762		$114,909

Financial Analysis	Conventional	Organic
Meat	126,623	108,074
Wool	46,170	40,053
Total Income	172,793	148,127
Expenditure	36,031	33,218
Profit	136,762	114,909
Per Stock Unit	136,762 / 3,000	114,909 / 2,700
	= $45.58 / su	= $42.55 / su (93%)
	= $684 / ha	= $574 / ha (84%)

4.3 Sensitivity Analysis

		Organic Meat Price Premium %				
$ / su		**0**	**10**	**30**	**50**	**100**
Organic	0	42.55	46.61	54.74	62.86	83.16
Wool	10	44.04	48.10	56.23	64.35	84.65
Price	30	47.00	51.06	59.19	67.31	87.61
Premium	50	49.97	54.03	62.16	70.28	90.58
%	100	57.39	61.45	69.58	77.70	98.00

Notes for Financial Comparison

Based on this budget the following comparisons can be made:

1. To match the conventional per stock unit level the organic farm would need a:
   - 7.5% premium for meat, or
   - 20% premium for wool.

2. To match the conventional per hectare level the organic farm would need a to return $50.65 per stock unit. This equals:
   - 20% premium for meat, or
   - 56% premium for wool.

3. To match the conventional per stock unit level the level of expenses on the organic farm would need to be reduced by 24% on budgeted figures.

4. The per stock unit return for the organic farm is 93% of the conventional return.

5. The per hectare return for the organic farm is 84% of the conventional farm.

After the two year transitional period, production tends to improve in the organic system which may allow a stocking rate comparable to conventional systems. [26]

5.0 Processing and Marketing of Organic Meat and Wool

5.1 The Current Situation

In late 1995 the Organic Products Exporters Group (OPEG) took the first steps to develop a sustainable commercially viable, certified organic products exporting industry.

Currently three of the 33 member (OPEG) are sheep and beef farmers and they were all active in developing and marketing their products internationally before OPEG was established.

There appears to be no co-ordination in the organic livestock industry in New Zealand. The BIO-GRO NZ organisation has a few large commercially successful sheep and beef producers but is dominated by small lifestyle blocks growing mainly fruit, vegetables, some larger arable farms and honey production. Many organically certified and uncertified sheep and beef growers are selling their product through conventional channels at conventional prices.

5.2 Domestic Processing and Marketing of Organic Meat

The domestic market for organic meats is small and generally demand is static.

The St Martins New World Supermarket in Christchurch has the largest selection of organics food in the South Island. It sells organic beef and lamb. Demand for these products is not high. Five lambs are processed each week.

Lamb is bought on a per kilogram basis at a premium of 15% over schedule and attracts a 50% premium over traditional lamb cuts. The premium for beef is around 100%.

Comments from butchers and the St Martins New World Supermarket indicate that domestic organic meat marketing has not been as successful or lucrative as traditional lamb and beef. The Kiwi consumer is not well informed about organic meat, rather it is mainly ex European or "greenie" people who are purchasing the product. [32]

5.3 International Processing and Marketing of Organic Meat

5.3.1 South Island Meat Companies Views on Organic Meat

A questionnaire was sent to the Chief Executives of the four South Island meat companies:

- Alliance Group
- Primary Producers Co-operative Society
- Blue Sky Meats
- Canterbury Meat Packers

They all responded to the questionnaire and the following are the views they expressed without identifying individual company positions.

5.3.2 Responses to Questionnaire

- ***Would you consider processing and marketing organic meat?***

  Only one southern company is currently processing small quantities of organic lamb and beef. Some of this product is marketed by the producer. The rest are not currently involved but continue to monitor the situation.

  The general consensus was that at present there is not a consistent international demand for organic meats and there would be problems sourcing the quantity and quality of stock demanded for export markets.

  There are niche markets for organic meats in the EU, Asia and the USA.

  Consumers are demanding improved food safety and animal welfare standards. These concerns rate more highly for the consumers of our lamb and beef than whether the produce is organically grown. Meat companies are currently moving to address these concerns.

  The level of premium which organic meat would attract ranged from 0% to a 30% premium in the Asian market.

- ***What level of market demand would you consider necessary to justify your company's involvement with organic meat?***

  Markets must be demand driven. In the initial stages of developing a new market, small consignments would be sent to test the market.

  The company currently involved stated that chilled product can be air freighted on a weekly basis to fill special niche market demands, so volume isn't a problem.

  They also send mixed containers of chilled and frozen product to specific markets (7 tonne carcass or 11 - 17 tonne or processed product).

- ***What minimum number of organically reared sheep and cattle would you consider necessary to justify processing this stock?***

  The company processing organic meat stated it prefers to process at least 200 carcasses at one time due to time losses when changing specifications in the boning room and packaging.

  One company said it wouldn't consider processing unless there was at least a line of 1,000 to process.

- ***Would you consider processing stock for the domestic market?***

  One company said that subject to meeting certain conditions regarding payment and meeting contractual arrangements it would consider this.

- ***Would you see the marketing of organic meat as a competitive or complimentary product to our export lamb and beef products, based on quality and price?***

  There was some concern raised that marketing organic meat in some countries would in fact result in a discount for our traditional export meat rather than a premium for the organic product. However if organic meat was differentiated in branding and placed in niche markets then this effect would be minimised.

- ***Would organic meat strengthen or harm the consumers perception of New Zealand's clean green image?***

  This could be good or bad depending on how it was managed. Maintaining our reputation for high quality food products produced off our relatively clean green environment was in the hands of everyone in the production chain. That includes the farmers, transporters, processors and marketer, regardless of the type of product.

5.3.3 Past Attempts to Export Organic Lamb [29] [36]

During the early 1990's the Fortex Meat Company attempted on three separate occasions to arrange a consignment of organic lamb for processing and sale to a supermarket buyer in Britain. The company had problems filling the three consignments due to several factors:

- The actual supply of lamb was well below what farmers initially stated was available.
- The quality of the stock presented meant some animals were rejected.
- High residue levels of DDE meant up to 50% of lambs were rejected for shipment.
- The supermarket was only after primal cuts which meant the rest had to be sold conventionally. This resulted in only a 5 - 7% premium.

5.4 International Markets for Organic Meat

The three main organic meat markets are the European, Japanese and USA markets.

5.4.1 European Market

5.4.1.1 British Market [33]

The British market for organic lamb and beef has the following dynamics:

- 24,000 organically certified lambs killed during 1996
- 3,500 organically certified beef cattle killed in 1996
- Several processors now taking organic lamb and beef
- 50% annual growth for organic food demand
- 50,000 hectares land organically certified

- Specialist co-operatives marketing meat.

Helen Browning from Eastbrook Farm in Wiltshire, England runs a large organic farm (550 ha) producing lamb, beef, dairy products, pork, chicken and cereals. She considers the long term premium for organic lamb to be 12% above conventional prices.

Farmers are experiencing 50% annual growth in organic food demand due to BSE, health, animal welfare and environmental issues which consumers are concerned about. The issue of taste is also a factor in the consumer's choice.

5.4.1.2 German Market [2]

Currently the organic share of the German food market is approximately 1.5% of NZ$300 billion.

Market research (Frost, Sullivan in 1996) predicted that organic meat and dairy produce will grow by 190% between 1996 and 2002. The main reasons listed were the BSE scandal, consumers are rejecting intensive farming methods and trust in existing hygiene standards has gone. Of people surveyed 53% claimed the main reason they brought organic produce was to support the ecological movement in Germany. 19% were against conventional farming methods.

5.4.2 Asian Market

5.4.2.1 Japan [2]

Japan's food imports increased 9.3% during the 1995 year to US$51.49 billion. The growth rate for meat imports showed the highest increase at 24% growth.

The Japanese are not traditional sheep meat consumers, they prefer beef. They are however prepared to pay top premiums for organic lamb and beef products.

There are no standards for organics in Japan, only guidelines released in 1992. Supermarkets are increasingly handling organics in speciality sections with retail prices 10% - 30% above conventional products.

5.4.2.2 Case Study of Organic Sheep and Beef Farmer [3]

Tim and Helen Gow, Blackmount, Western Southland, are exporting organic lamb and beef to top Japanese restaurants. They attained their own meat export licence in September 1996 and have been marketing their product internationally under the BIO-GRO label.

Prices achieved:

- Up to 120% premium for lamb above NZ market price
- Up to 300% premium for beef above NZ market price

Demand:

Requests for product ranging from 10 to 200 tonnes. Mr Gow stated that Japanese importers believe that by the end of the century the massive restaurant and supermarket trades will be demanding that their meat has been organically grown.

Supply:

About 40 tonnes per month of organic beef is imported into Japan mainly from USA but also from New Zealand.

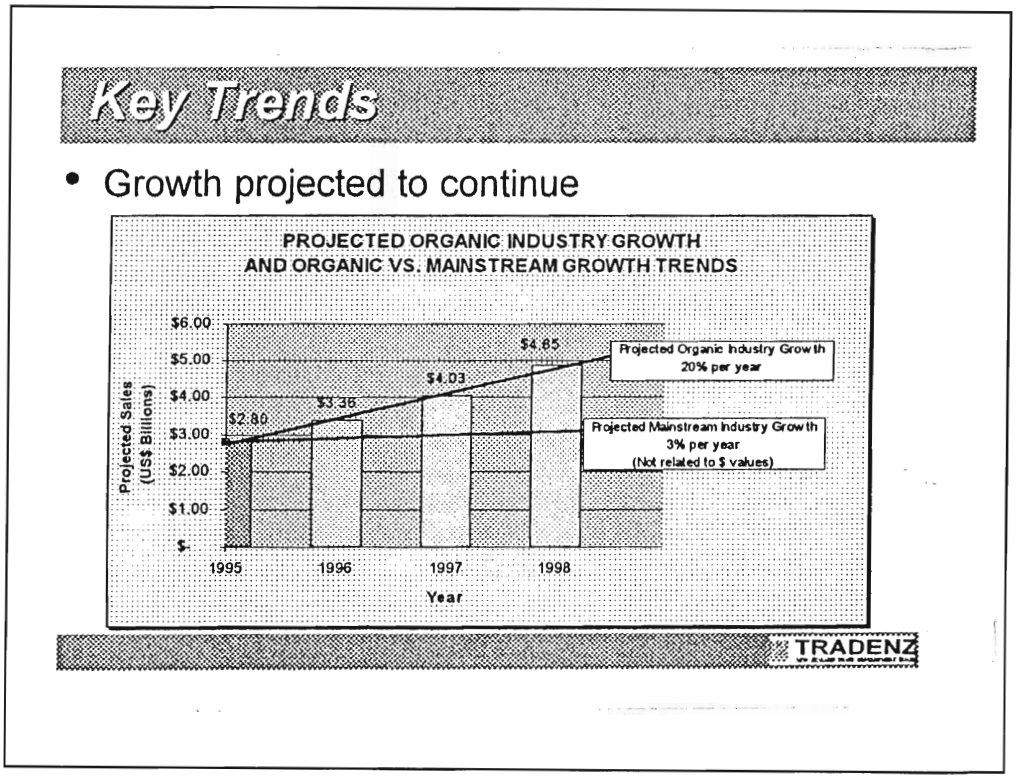
5.4.3 United States Market [2]

The USA market is the largest single organic market with sales of $3 billion per annum. Most of this is produced domestically.

Growth of the organic food industry is rising at 23% per annum compared to 3% for conventional products. This growth is being driven by health conscious Americans and their general acceptance of organic products. There is also aggressive expansion by conventional retailers into the organic product lines.

The American people eat large quantities of beef but not lamb. In 1995 sales of organic meat reached US$32 million compared to US$30 million for dairy products and US$402 million for fruit and vegetables.

5.4.3.1 Growth of USA Market



5.5 Domestic and International Situation for Organic Wool

5.5.1 Situation

The demand for residue free and organically certified wool is mixed. There are opportunities for residue free wool in Germany, Japan and the USA.

Germany has the toughest regulations with any residues found in the wool resulting in the rejection of whole shipments or organic wool. Japan fumigates wool as it enters the country which defeats the purpose of supplying organic wool. [34]

5.5.2 Case Study of Organic Sheep Farmer

Robert and Jackie Aitchison, Treliske Farm, Ettrick, Central Otago:

- 1,200 ha farm certified BIO-GRO organic for 16 years
- Export BIO-GRO certified Merino yarn to USA
- Sells to domestic tourist trade
- Manufactures woollen hats, sweaters and baby wear under the Treliske brand.

Prices achieved:

- $50 / kg for processed Merino product
- $7 / kg greasy for crossbred hogget fleece wool, 29-31 micron
- $10 / kg scoured for the same product

5.5.3 Demand for Organic Wool

Farmers are in general sceptical about premiums for organically certified wool and the consistency of demand.

Wools of NZ have tried to organise buyers but have been frustrated by buyers who are not prepared to commit more than one year out. The general lack of demand for all wool products is compounding this problem. [14]

The best opportunities appear to be in small volume, high value, niche apparel markets in the USA and Europe.

In the April 1997 issue of Bio News, two overseas companies were advertising for organic wool.

- A German company was looking for 15,000 kg in 1997 and eventually 20,000 kg of 30 - 32 micron, 75 mm length, raw or scoured wool. The end use is for mattresses.

- A Swedish textile factory looking for certified wool.

5.5.4 Supply of Organic Wool

Residue free wool which is from sheep that haven't been dipped for at least two years is in short supply. Conventional farmers are not prepared to risk outbreaks of lice in order to produce residue free wool.

Most organic wool is sold through conventional outlets.

6.0 References

6.1 References

[1] OPEG publicity brochure

[2] Tradenz NZ presentations to OPEG on USA, German, Japanese markets

[3] Tim & Helen Gow - Otago Daily Times, 18 July 1997

[4] Tradenz

[5] Mark Levick - Chief Executive of BIO-GRO NZ

[6] NZ Farmer, 31 July 1997

[7] Rural News, 18 August 1997

[8] Ray Moss - AgResearch Winchmore Field Day, 23 April 1996

[9] Bill Pomroy - Animal Industries Workshop Lincoln University (AIWLU), June 1997

[10] Alastair Nichol - (AIWLU), June 1997, Chpt 20

[11] John Donaldson - (AIWLU), June 1997, Chpt 15

[12] Allen Heath - AgResearch Scientist, Wallaceville

[13] Ian Barger - (AIWLU), June 1997, Chpt 11

[14] Stuart Edwards - Wools of NZ, Christchurch

[15] Richard Ridderford - Game Industry Board Chairman, Rural News, 24 February 1997

[16] Farm Equipment News, August 1997

[17] Bio News, May 1996

[18] BIO-GRO Production Standards

[19] J C McEwan - NZ Journal of Zoology 1994, Vol 21, pg 103, 104

[20] Dr Peter Waller - Biological Control of Parasitism (AIWLU), Chpt 17

[21] Tim & Helen Gow - Mangapiri Downs, Western Southland

[22] BIO-GRO Licensees as at 20 August 1997

[23] AgResearch Winchmore Research Station

[24] Mixed Livestock Production in an Agrichemical-free Environment - A farmlet study, A & D Mackay, K Betteridge & Co, 1996 Ballantrae

[25] Visit to Winchmore Research Station, 15 May 1997

[26] Visit to AgResearch in Palmerston North, 27 June 1997

[27] John McEwan (AIWLU), June 1997, Chpt 13

[28] Otago Southland Farmer, October 1996

[29] John Manhire, John Niezen, AgResearch Winchmore Field Day, 23 April 1996

[30] Winchmore Organic Farmlet, NZ Farmer, 30 January 1997

[31] David Musgrave, organic farmer, Geraldine

[32] St Martins New World Supermarket, Christchurch, Butcher Manager October 1997

[33] Helen Browning - British organic farmer, September 1997

[34] Robert & Jackie Aitchison - organic wool producers and marketers, Ettrick, Central Otago

[35] Farmers Benefit From Biocontrol, Southland Times, 10 July 1997

[36] Hugh Campbell - Recent Developments in Organic Food Production in New Zealand 1996

[37] Gopal R M, Pomroy W E, NZ Society for Parasitology, Sept 1997

6.2 Questionnaire for South Island Meat Companies

Avalon
Heriot RD 2
Tapanui

The Chief Executive
Canterbury Meat Packers Ltd
PO Box 101
Ashburton

23 September 1997

Dear Sir

I am a sheep and beef farmer from Heriot in West Otago running 11,500 su's. I am currently completing the 1997 Kellogs Leadership Course.

As part of the requirements for the course a project relevant to rural New Zealand must be completed. The project I am working on is the following:

"Potential for commercial organic sheep farming in the South Island"

My motivation for choosing this subject is because I have been selecting for worm resistance in my stud and commercial sheep for the last 8 years. I now have sheep which out perform unselected sheep without requiring drenching to achieve that performance level.

While there are people farming organically on a commercial basis, there are still doubts about the processing and marketing of organic meat products.

Recognising your role as a progressive and leading meat company, I would appreciate any comments you may have regarding the following questionnaire.

Thank you for the opportunity to address these questions to your company. I have to present my project at Lincoln University in early November.

If you are interested, I am happy to send you a copy of my report in due course.

Yours faithfully

AG Richardson