

**Commerce Division
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**IS LIVESTOCK A SUNSET
INDUSTRY?**

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Contents

| | |
|------------------------------|---|
| List of Tables | i |
| 1. Introduction | 1 |
| 2. World Market Trends | 2 |
| 3. New Zealand Export Trends | 5 |
| 4. World Forecasts | 6 |
| References | 8 |

List of Tables

- | | | |
|----|---|---|
| 1. | Organic Markets | 9 |
| 2. | Projected Livestock Product Consumption | 9 |

“A revolution is taking place in global agriculture that has profound implications for human health, livelihoods and the environment. Population growth, urbanisation, and income growth in developing countries are fueling a massive increase in demand for food of animal origin. These changes in the diets of billions of people could significantly improve the well-being of many rural poor.”

Delgado et al (1999), IFPRI

1. Introduction

A great deal of attention has been focused in recent years on ethical and health issues regarding the supply and demand for livestock products. Accordingly, the conference organisers suggested the above title for the paper. The issues raised range from animal welfare rights on the supply side to ethical and health issues on the demand side. Some people are concerned with the health risks associated with livestock product consumption. Others, like Godlovich (1997), can cogently argue a case that the production and consumption of livestock products is a moral progress issue.

Such views are strongly at variance with a number of contrasting trends in the world markets for animal products and this paper is designed to try to elucidate the basis for these counter views.

As a philosopher, my colleague Stan Godlovich argues that trends away from animal product consumption are part of a moral progression. He would argue that we might expect peoples' diets to move away from animal products in the same way that mankind moved away from legalised slavery in the 19th century (at least in many countries). Now Stan may well be right. The problem is that I know of no basis upon which social science models (including economic models) would be able to forecast such a change. This is because such change is likely to involve a major discontinuity. This might be a ‘band-wagon’ effect caused by the slow accumulation of a consciousness that suddenly results in a widespread behavioural response. In short, there are arguments in support of either proposition: that livestock is, and is not a sunset industry. It is the empirical evidence that is focused on here.

The best I can do here is to report empirical studies that are based on behavioural changes as they are reflected in the currently available data sets. The question I pose is whether the New Zealand livestock industry appears to be developing the characteristics of a ‘Sunset Industry’, as that is manifest in current market behaviour. In economic terms it is a complex question which can be interpreted in a comparative advantage framework. According to the recent input-output tables the livestock sector in New Zealand (interpreted to mean farm production plus meat and dairy product processing) represents around 6 percent of total GDP (cf. health sector around 8 percent) and currently a quarter of export earnings on a current account basis (down from around a third of export earnings in 1986/87: though drought impacts and other factors suggest this change may not represent a trend).

These are large numbers which imply that changes in the economic status of the livestock sector in the New Zealand economy can be expected to have broad implications for growth and employment, nationwide. Equity in New Zealand society may be effected as well as efficiency. It may be worth noting, for example, that the livestock sector in New Zealand is a very large employer of people with low or no formal educational qualifications. Accordingly, the New Zealand distribution of income may also be affected by changing livestock sector prosperity.

In a comparative advantage framework, the size of an export industry can be affected by two broad sets of factors: global demand and relative export competitiveness in New Zealand. Both sets of issues are addressed here.

2. World Market Trends

The largest relevant market within which to evaluate the question is the world market because the livestock sector of the New Zealand economy is highly export oriented with a ratio of export sales to domestic sales greater than five. This is not to say that the domestic livestock market is unimportant. The domestic market is simply much smaller than the export market and in any event the characteristics of consumer demand in both tend to overlap. In that latter sense, our discussion of the export market encompasses domestic considerations.

World demand for meat products has grown steadily over the last 25 years by over 3 percent per year. According to FAO statistics (production yearbooks), world meat production was around 120 million tonnes in 1974 rising to around 220 million tonnes in 1997. (I am using production as a measure of consumption on the grounds that inventory changes are unlikely to represent a large proportion of total production.) There is the suggestion in this data that the rate of increase in meat consumption has changed over the period in a way that tends to support the quotation from the International Food Policy Research Centre at the beginning of the paper. Beginning in the early to mid 1980's increases in meat consumption appears to have begun accelerating.

Increasing world meat consumption can be explained in part by Engel's Law. In most societies, meat represents a luxury food product so that with rising income levels, a higher proportion of consumer's food budgets can be expected to be devoted to meat consumption. Incomes have grown around the world in recent decades, particularly in Less Developed Countries driving up meat demand relative to other foods - according to the Law. Empirical evidence for this proposition is given, for example, by income elasticities of demand for various food groups in selected countries, Coyle et al (1998).

Engel's Law operates between consumption groups as well as within the food group, of course. Accordingly, in high-income societies with high customary livestock product consumption levels, rising incomes will result in relative shifts away from food as a whole (including livestock products) towards other goods and services. In the US and the EU, for example, rising incomes in the future can be expected to lead to slower growth in livestock product consumption and faster growth in non-food items (unless a radical change in consumption habits occurs).

A similar growth pattern has applied to the consumption of all livestock products, which includes dairy and other products in addition to meat, again based on FAO production yearbooks. As with meat, the growth rate has been around 3 percent per annum. However, there is no obvious change in the slope of the trend in livestock product consumption.

FAO also calculates changes in the per capita consumption of food products, worldwide. Livestock product consumption per capita in the world has been increasing and perhaps even increasing at an increasing rate since the early 1990's. Again, this trend appears to reflect

Engel's Law, particularly as it would apply to countries beginning from low absolute levels of livestock product consumption.

The growth trend in total world consumption limits the potential export market growth for New Zealand. Considering meat alone, 3 percent growth in the world consumption of meat represents an annual demand increment of 6 million tonnes per year. This is a huge market opportunity relative to potential New Zealand supply increases. A tiny New Zealand niche in this sort of market expansion would suffice to add significant growth in our income levels.

A second aspect of demand growth for alternative foods is in organics. To a limited extent, the demand for organics is a demand for non-livestock products. At least the demand for organic foods provides us with a window on the dietary habits of one group of safety conscious consumers or food consumers particularly attuned to a particular set of ethical propositions.

Table 1 provides a snapshot of the size of the world organics markets. For selected countries, the first column gives estimates of the share of organic products in total food consumption in the late 1990's. These shares are currently small ranging from 0.2 percent to 1.5 percent of food consumption. These shares are similar for other countries surveyed by Lohr (1998), but not shown in the Table.

It is difficult to judge the implications of these small market shares for organic products because there has been no data collected on organics consumption in the major national food surveys in the past. However, Charles Lamb (1999) has argued that these shares may not be increasing very rapidly, if at all. He bases this conclusion on cases like Germany where there has been a notable health food movement for at least 200 years. Yet in spite of this support the market share of organics is still only around 1.5 percent.

Counter claims are made regarding the position of vegetarianism. Stan Godlovich (Lincoln University, pers comm.) has reported surveys of British undergraduates which apparently show proportions of vegetarians around 20 percent. This snapshot too, however, tells us very little about the future demand for livestock products, in part because we need additional information on the motives lying behind current choices. For example, low income undergraduate students (oxymoron) who do not eat livestock products because they hold particular ethical, religious or other positions, may represent a lowering of future livestock

product demand - if those positions persist. However, if the current dietary pattern results from their response to low incomes alone, then this group can be expected to contribute to significant demand growth in livestock products once they graduate from university: Engel's Law again.

The second column of Table 1 gives the share of organic food consumption in these selected markets contributed by imports. These import shares, excepting Japan, are much higher than food import shares generally (which are around 5 percent). The high import shares for organics represent an important market for New Zealand, especially in the niche end of this market (because due to resource constraints there are very few products where New Zealand has a comparative advantage in the bulk end of markets). Furthermore, the organics price premia in these markets are quite large. The higher sales revenue implicit in these figures provides significant resources to fund any additional costs of organics production, fund the lower productivity of land devoted to organics and fund additional research in organics development.

There are very few studies available for New Zealand which have examined the substitution possibilities of either organics for non-organics or crops for livestock in detail for our production system. A recent study, Lamb (1994), suggests that the substitution possibilities for organic peas, at least, are very promising.

3. New Zealand Export Trends

A second question is how New Zealand exports have fared relative to the growth in world consumption. New Zealand meat exports have grown consistently over the last fifty years and have nearly trebled since 1950. Within the meat group, the fastest rates of growth in consumption have tended to be for those products with the fastest growth in production efficiency like chicken and dairy products. This is unsurprising because faster production efficiency leads to faster reductions in real market prices which increases relative demand.

Comparative advantage theory attributes this export growth to two sets of factors: world market demand growth and the relative ability of the livestock sector in New Zealand to compete for domestic resources. The world demand factors can be summarised in the

relationship between the share of New Zealand exports of meat in world consumption. There appears to have been a slight decline in New Zealand exports of meat relative to world meat consumption, at least since 1974. However, when we bear in mind that New Zealand exports contribute less than half of one percent of world consumption, the slight decline in share may actually be interpreted positively: that is, that its rather heartening that given New Zealand's small resource base and that world demand has risen steadily, that New Zealand's share has not declined more rapidly or to a greater degree than it actually has. In other words, New Zealand has a strong comparative advantage in meat production. A similar argument can be made for dairy products.

New Zealand's meat market share performance is all the more positive given changes that have occurred in foreign trade policies affecting market access. When we choose a base year of 1974 we bias the resulting trend as a result of sudden demand changes that accompanied the UK accession to the EU. This one off policy switch significantly reduced NZ trade possibilities in dairy products and gradually reduced them for meat as well. Outside the EU, increasing import quota restrictions and other non-tariff barriers increasingly restrained NZ exports of livestock products in the 1970's and have remained at high levels even since the Uruguay GATT Round was completed in 1994.

4. World Forecasts

So much for the past but what of the future? Forecasts of the demand for various food groups can be made on the basis of estimated demand behavioural parameters and forecasts of income and other influential variables. For global forecasts, these demand parameters need to be estimated by country and that process is very data intensive. Accordingly, it is only possible, usually, to re-estimate the behavioural parameters from time to time, say every decade. Cranfield et al (1998) have estimated such parameters for a variety of countries spanning various income levels, continents, cultures and stages of development. Then using the popular GTAP global modelling system, a set of forecasts of livestock product consumption was made for the year 2020.

Selected results from Cranfield are given in Table 2. They forecast, for example, that the total consumption of livestock products in the United States is expected to rise (in real terms)

from US\$249 billion in 1995 to around US\$390 billion by 2020 (or by 1.8 percent per year), Table 2. Other countries reported in the Table encompass other continents. Lower income countries like Ethiopia, of course, are expected to show faster growth (3.4 percent per year), as are countries with higher incomes but lower initial livestock product consumption levels like Korea (3.2 percent per year).

Globally, these projected increases in livestock product demand are very large relative to NZ's supply potential. Provided NZ production and trade barriers do not reduce our competitiveness significantly and provided we continue our marketing efforts, there is no evidence in these historic and forecast information that suggests that livestock is a sunset industry in New Zealand, quite the reverse in fact.

These market growth quantities are so large that New Zealand only needs to capture a tiny fraction of the increases forecast, to maintain the role of livestock within the New Zealand economy. There is every indication that it will do so. World market signals are more transparent in New Zealand than previously and this is leading to increased and more focused research, production and marketing efforts.

New Zealand has the options of adopting bulk or niche marketing strategies in a wide range of markets as the expected trade barrier reductions of the WTO occur. New Zealand has scale economies at both the farm and at the processing level. This provides the opportunity to supply bulk commodity livestock product markets competitively with one proviso: New Zealand livestock technology has to continue to advance at least as fast as that in other livestock producing countries.

Alternatively, New Zealand can opt for higher value added niche markets as it has increasingly done. It can also adopt both strategies. Commodity exports are predicated on cheap land availability or high productivity per unit land area. Niche exports are reliant on the continuing supply of innovation and market novelty. It is not a matter of "he who dares, wins"; it is a matter of capturing sufficient domestic research, production and marketing resources (physical or intellectual) in New Zealand, more cheaply than our overseas competitors.

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Table 1
Organic Markets

| Country | Organic Share | Import Share | Retail Price Premium |
|------------------|----------------------|---------------------|-----------------------------|
| Denmark | < 3 % | 25% | 15-40% |
| Germany | 1.5% | 60% | 30% |
| Canada | 1.0% | 80% | 30% |
| Australia | 0.2% | 0-13% | 12-65% |
| Japan | 1.0% | 1% | 20-30% |

Source: Lohr (1998).

Table 2
Projected Livestock Product Consumption
(US \$ billions, annual percentage growth rates in brackets)

| Country | Year | |
|----------------------|-------------|-----------------|
| | 1995 | 2020 |
| Ethiopia | 0.75 | 1.73 (3.4) |
| Pakistan | 5.79 | 12.14 (3.0) |
| Senegal | 0.45 | 0.97 (3.1) |
| Korea | 11.76 | 25.81 (3.2) |
| France | 33.68 | 52.34 (1.8) |
| United States | 249.16 | 390.77 (1.8) |

Source: Cranfield et al. (1998).

Footnote: Based on 1985 ICP data.

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