Supply Chain Management

Building partnerships and alliances in international food and agribusiness

A report for the Rural Industries Research and Development Corporation

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Foreword

The Rural Industries Research and Development Corporation commissioned this report, which arose from a four-day executive development program held in Singapore in late 1999, sponsored by RIRDC. The program incorporated views and case studies from a number of the world’s leading authorities on supply chain management. This report analyses and draws conclusions from the information presented.

It deals with the changing face of the food and agriculture business and the implications for each part of the supply chain. It also provides a thorough understanding of international perspectives in supply chain management, including retail and manufacturing trends, quality management, new technologies, brand building and strategy development.

This publication considers some of the fundamental changes occurring to our traditional relationships between retailer, manufacturer, distributor and farmer.

This project was funded from RIRDC Core Funds which are provided by the Federal Government.

This report, a new addition to RIRDC’s diverse range of over 700 research publications, forms part of our Global Competitiveness R&D program, which aims to identify important impediments to the development of a globally competitive Australian agricultural sector and support research that will lead to options and strategies.

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Peter Core
Managing Director
Rural Industries Research and Development Corporation
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Executive Summary

This report was commissioned to provide a thorough understanding of the international perspective’s in supply chain management, including retail and manufacturing trends, quality management, genetically modified foods, brand building and strategy development.

The research report has been compiled based upon the findings of a four-day professional development program focussing on supply chain management. The program incorporated views and case studies from a number of the world’s leading academics and company representatives.

There are some fundamental changes occurring to our traditional relationships between retailer, manufacturer, distributor and farmer. The most recent of these is the movement towards partnerships and alliances. What does all this mean? Do these linkages improve efficiency in the production and marketing of food products? What qualities among staff and organisational structures are required to make and retain a successful alliance or partner? How are the benefits of partnerships and alliances shared out and in particular, what are the gains to all along the chain – do partnerships and alliances help reduce costs, improve availability, increase choice and raise quality? This report helps to answer some of these key questions.

This report provides an analysis of the food and agribusiness sector in Asia and Europe, consumer and retail patterns, manufacturer responses, quality management issues and the linkages in the chain to increase overall efficiency.

A lot has been written and said about the impact the Asian crisis had on the respective economies of their countries. There no doubt has been a significant slowdown in the growth of the various economies. What isn’t well known is the food and agribusiness sector performed extremely well during the crisis of 1998. In Malaysia, whilst the overall GDP growth rate was –5.1% their food and agribusiness growth rate grew by 8.5%. Thailand’s GDP in 1998 was –7.0%, whilst its food and agribusiness sector grew by 11.0%. Vietnam had a GDP of 5.8% but its food and agribusiness GDP improved by 28%. The Philippines had a GDP of -0.5% and a 20% increase in the food and agribusiness industry. Indonesia had a significant reduction in GDP of –15.3% but a 15.5% increase in their food and agribusiness GDP.

The main concern however is the very real lack of coordination from production through to consumer. It is found that in excess of 25% is lost from the farm to the factory. Each country in Asia has its own set of supply chain issues and therefore cannot to be treated as one. An important issue for the prospective marketer of produce.

Consumption patterns are changing dramatically all over the world. There are more double income families, they are working longer hours, have more disposable income and have an increased exposure to advertising. Resulting in an increase in the number of Hypermarkets (one stop shops for everything), convenience stores and the consumption of refrigerated/packaged goods. In addition:

- There has been an increase in the globalisation and rationalisation of retailers and manufacturers. It is predicted that within the next five to ten years there will only be four to five major retailers in the world.
- The development of health, the environment and animal welfare as defining issues.
- The increasing awareness of consumers as to how and where our food is grown and treated.
- Food as a fashion item, rather than a subsistence item.
- The impact of new technologies such as biotechnology and the internet on the traditional supply chain.
Biotechnology has become a key issue for all partners in the supply chain and could have the greatest impact on the food and agribusiness industry. Control over the supply chain traditionally with the manufacturer, now with the retailer and in the future could be with the developer of the seed or technology.

Advances in biotechnology can provide considerable benefits to society and probably will continue to do so in the next Century – on a par, if not more so, than electronics and information technology contributions in this century. We are already benefiting considerably from the application of biotechnology in health-care; the pharmaceutical industry and food processing – with much more to come. The adverse reactions to agricultural biotechnology and genetic foods around the world have had a significant impact on the development of biotechnology. In this area, consumers tend to feel that there are more risks than public benefits.

It is quite clear, however, that consumers must be consulted and involved. Without whom, of course, there will be no market for Genetically Modified Products. Everyone involved in the food chain needs to accept collective responsibility for new technology adoption – and to ensure that agricultural biotechnology can continue to develop.

The impact of a number of health scares including BSE in cattle in Europe, Bird Flu in Hong Kong and Viral Encephalitis in Malaysia has meant a significant investment by all in the supply chain in the development of workable, traceable and independent quality assurance systems. The importance of this to a country like Singapore is significant as they immediately banned pork from Malaysia and beef from Europe. This has been extensively detailed in the case study at the back of the report.

The implications of these changes on all the partners of the supply chain are significant. The retailer has to try and cut costs to continue to compete internationally. Obtaining savings from supply chain partners can only do this. This is achieved through much stronger and longer-term relationships with manufacturers, producers and distributors.

The manufacturer will continue to concentrate into fewer hands resulting in niche type opportunities. Closer ties will have to be formed with the suppliers of raw materials.

Finally, the producer will have to develop closer ties with the retailer and processor. The must be of a size to or clout to obtain preferred supplier status or they will be unable to compete. The best way of doing this may be is to form a marketing group. This group must be able to provide a product that is high quality and consistent. The group must be innovative and have a preference for a long-term relationship.

There is no doubt that we are going through significant change in the food and agribusiness sector and each partner in the supply chain has to cooperate to ensure the savings resulting from supply chain management lead to more profitable returns for all. However an agribusiness organization needs to do a number of things namely, identify new consumer needs and new usages, diversify into sectors within the existing geographical market, explore new distribution channels and invest in your brands.
Part I

1. Setting the Scene

1.1 Introduction

In this document we focus on the development of alliances and partnerships across the world and explore how fundamental relationships between retailer, manufacturer, distributor and farmers are changing an entire industry.

The conclusions of this document are based on the findings of a four-day executive program on supply chain management which showed how driven by different consumer requirements and new technologies, food industry participants, led by retailers have developed new ways to meet consumer demand and increase profitability. The underlying theme is that partnerships and alliances in production, marketing and distribution of food products represent success through cooperation, rather than through an adversarial approach.

In the manual – Improving Your Supply Chain (1998, Page 3) by the Federal Government’s Industry, Science and Technology Department (ISTC) it defines a supply chain as “an organization that covers the full range of activities from the earliest level of input through the internal processes in the host organization and on to the output distribution system. The input elements cover the supply of raw materials, components, assemblies and packaging. The internal elements cover goods inwards receipt, warehousing, movement to line operations, work in progress storage and movement, finished goods inventory, picking, palletising and despatch. The output end of the chain covers wholesale distribution, external warehousing retail distribution, returns and service and anything necessary to get the product to the client in the most satisfactory way. The supply represents the physical value chain of the host organization”.

In the same document by the ISTC (1998, Page 3) it defines supply chain management as “A partnership of organizations involved with a specific supply or value chain of activities”

1.2 Vertical Partnerships

In the book Breaking With Tradition (Hughes, 1994 Page 3), “vertical integration is the term used to describe the consecutive stages in a marketing chain when they come under one ownership. Thus, a partnership is located on a continuum somewhere between free market forces at one end, to vertical integration of the marketing channel at the other”.

The definition of partnership in the same book Hughes (1994 Page 4) is “Some arrangement between buyer and seller entered into freely, to facilitate a mutually satisfying exchange over time, which leaves the operation and control of the two businesses substantially independent of each other”.

In other words, partnership arrangements are not bound by contracts or legal arrangements but rather the spirit and intention of the participating parties to do business. That means that partners support each other to achieve their objectives and share responsibility to conclude a satisfactory exchange.

1.3 Horizontal Alliances

Hughes (1994, page 5) explains that “an alliance leaves the allies as independent companies, though perhaps with cross ownership of shares. Whereas partnerships in the food industry are, most frequently, between successive links in the food chain (e.g. retailer with processor with farmer), alliances are, generally, between firms at the same level (e.g. processor with processor).
Arguably, the principal reason for establishing an alliance between two companies is to increase power in the market – whether it be buying or selling. Ancillary reasons include accelerating the pace and reducing the cost of penetrating new markets and sharing costs and technology of new product development.”

1.4 Drivers for Change

There are fundamental changes occurring to our traditional relationships between retailers, manufacturers, distributors and farmers.

The most recent of these is the movement towards the building of partnerships and alliances. What does all this mean? Do these linkages improve efficiency in the production and marketing of food products? What qualities among staff and organisational structures are required to make a successful alliance or partner? How are the benefits of partnerships shared out and in particular, what are the gains to those along the chain – do alliances and partnerships help reduce prices, improve availability, increase choice and raise quality?

This report will provide an increased understanding of supply chain management and the building of partnerships and alliances in international food and agribusiness. More specifically:

• A thorough understanding of supply chain management.
• International perspective’s in supply chain management.
• An up to date analysis of the food and agribusiness situation in Asia.
• Retail, manufacturing and production responses to supply chain management.
• The importance of quality management to supply chain management.
• The critical success factors for the success of alliances or partnerships.
• The implications for each of the partners in the supply chain.
• What an agribusiness can do in the face of these changes.
2. The Environment for Food And Agribusiness in the Region

2.1 The Challenge

This section will provide an up to date overview of the food and agribusiness situation in South East Asia. It will incorporate the opportunities and challenges facing food and agribusiness companies in the region. This is crucial to understand and react to these changes.

2.2 The Impact of the Asian Crisis

- Economic Assessment

South East Asian countries are all on the way to recovery driven mainly by fiscal stimulus. All countries have demonstrated a steady and improved GDP. It is predicted that for the year 2000, Indonesia, Malaysia, Philippines, Thailand and Vietnam will all have GDP growth of more than 5%.

Inflation has continued to decline over the same period. Indonesia has had a reduction in its inflation rate from 64% in 1998 to a predicted 10% in 2000. Exports are expected to increase in particular for the Philippines and Indonesia. Imports are set to pick up moderately in 2000.

- Importance of Food and Agribusiness to the Region

Food and agribusiness is of increasing importance to region. Malaysia is the largest exporter of Palm Oil in the world, the third largest exporter of Rubber and the fifth in Cocoa. Thailand is the largest exporter of rice, rubber and shrimp. Vietnam is the second largest exporter of rice and coffee. The Philippines is the number one exporter of sugar and pineapple and Indonesia the second largest exporter of palm oil and rubber and the third largest cocoa exporter.

- 1998 Crisis

Food and Agribusiness performed extremely well in the crisis of 1998. In Malaysia for instance the overall GDP growth rate was –5.1% their food and agribusiness growth rate grew by 8.5%. Thailand’s GDP in 1998 was –7.0%, whilst its food and agribusiness sector grew by 11.0%. Vietnam had a GDP of 5.8% but its food and agribusiness GDP improved by 28%. The Philippines had a GDP of -0.5% and a 20% increase in the food and agribusiness industry. Indonesia had a significant reduction in GDP of –15.3% but a 15.5% increase in their food and agribusiness GDP.

- Changing Trends in Regional Food and Agribusiness Markets

Since the crisis there has been a significant change in consumption patterns towards basic foods and non-animal protein. Production methods changed to concentrate on import substitution of raw materials. The governments’ in the region have emphasised basic food security and development of the export sector.

- Impact on Food and Agribusiness Companies

As mentioned earlier Thailand’s food and agribusiness sector continued to grow through the 1997-98 crisis in Asia. GDP growth in 1997 was –3.8% and –4.7% in 1998. The food and agribusiness sector grew 1.7% and 1.2% respectively. The importance has continued in 1999 with a 2% GDP growth for food and agribusiness and a 0.9% GDP overall. This continued economic recovery in Thailand is dependent in the medium term on a number of factors, including:
• Government support for the very important processing industry.
• Strengthening of the baht affecting export competitiveness.
• Drop in economic recovery hurting the domestically focused companies.
• Opening up the local market by AFTA/WTO/APEC.

Indonesia’s agricultural sector has continued to grow significantly from 20% in March 1993 to over 25% in March 1998. At the same time the manufacturing sector, 20% in March 1993 has declined to 13% early in 1998. A mild recovery has ensued since then to around 17%.

The key factors for Indonesia’s continued growth is:
• Production growth in the key commodities of coffee, cocoa and rubber.
• Increased productivity and processing capacity.
• Appreciated rupiah weakening exports.
• Level of economic/political/social stability will affect the business environment.

This momentum of continued growth however seems to have stagnated into 1999. The main reasons for this are:
• In most countries, the export of commodities has been lower in the first half of 1999 due to an appreciation of their countries.
• A decline in global commodity prices leading to a reduction in margins.
• The attention recovery could decrease the attention of governments towards the agricultural sector.

2.3 The Way Ahead

There are many reasons for seeking growth opportunities in South East Asia. They are:
• Size of the market – there is 50% of the world’s population in the region.
• Increasing wealth – Pre-crisis GDP growth was between 5% and 12%.
• Growing consumption – consumption grew from 5% - 20% since 1990.
• Low cost producing region – wages have declined between 50% and 70%.
• Trade growth – flow of commerce in the region is recovering.

In the past, the food and agribusiness sector had the greatest potential for high returns. The perception of the industry however is that it is highly volatile, low return business. The reality however is that food and agribusiness is a lower risk than most industries.

2.4 The Value Chain Approach in the Food and Agribusiness Industry

There are significant differences between the value chain approaches of global companies and that of the regional companies of South East Asia.

Global Food and Agribusiness Market

<table>
<thead>
<tr>
<th>Raw Materials Supply</th>
<th>Primary Processing</th>
<th>Secondary Processing</th>
<th>Marketing &amp; Distribution</th>
<th>Sales &amp; Competition</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Volatile</td>
<td>Cost driven</td>
<td>Revenue Driven</td>
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<td></td>
<td>Supply</td>
<td>Processing</td>
<td>Processing</td>
<td></td>
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<td></td>
<td></td>
<td>Mainly</td>
<td>Outside Value</td>
<td></td>
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<td></td>
<td></td>
<td>Region</td>
<td>Adding Demand</td>
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<td>Difficult Managing Cost No revenue control</td>
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</tbody>
</table>

The current problems in the regional supply chain are many, including:

- An average of 20-30% of harvested produce is lost during transport from farm to factory.
- Important markets like the EU and Japan demand increasingly higher investments in quality control.
- Government involvement in improving regional logistics/infrastructure is as strong as required.

The important key success factors vary region by region and indicate the need for country-specific strategies. The following table illustrates this point.

<table>
<thead>
<tr>
<th>Key Factors</th>
<th>Success Factors</th>
<th>Product Affordability</th>
<th>Distribution</th>
<th>Localised Processing</th>
<th>Favourable Trade Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
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<td>Philippines</td>
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<td>Malaysia</td>
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<td>Thailand</td>
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<td>Vietnam</td>
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<tr>
<td>Japan</td>
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</tbody>
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2.5 The Role of the Private Sector and Government

There are three areas of support that industry and governments could provide and they are:

- Increased liquidity to facilitate implementation of investment projects in value-added agribusiness.
- Transfer of technology/expertise in the field of yield improvement and post-harvest infrastructure.
- Significant investments in supply chain management.

2.6 Action Plan for the Regional Food and Agribusiness Industry

An action plan is required for the region and should focus on:

- Renewing government attention on food and agribusiness as an export-earning vehicle.
- Looking for import replacement and for a drive back to locally produced basic food.
- An increase in the level of chain integration to capture the value-added part of the food chain.
- More of a focus on Core Business.

2.7 Summary

Food and agribusiness is “Big Business” in South East Asia and has a competitive advantage in the global market even with low commodity prices. It has the potential for a high return value added industry and is a safe haven for the second Asian crisis.
3. Forces Driving Partnerships and Alliances in Food and Agribusiness

3.1 Population and Demographic Changes

3.1.1 Age Profile of the Asian Population

Asia’s key consumer cohort is large and will grow significantly over the next five years. The number of people in the 20-39-age bracket is an important force for growth, representing new additions to the labour force and the consumer market.

In emerging Asia (excluding Japan) the 20-39 year old category is expected to be 616 million by the year 2000, more than three times the number of 20-39 year olds in the US (79 million) and EC (100 million) combined.

The 20-39 year old category is growing in Asia, from 543 million in 1990 to 616 million by 2000.

Low fertility rates in Asian countries (compared to the US and EC at a similar stage of development) means that wealth will be concentrated in the hands of “baby boomers”.

The typical modern Asian consumers in their thirties are married with young children, belonging to the new “have some” Asian middle class. They are accumulating some wealth, but are still prudent with their money.

They live in a constantly changing environment increasingly demanding about level of service and quality and put their family above all else.

South East Asia has a rapidly expanding middle class with an increasing level of household income. They are young career minded working couples that have a need for convenience; have a greater awareness of health and hygiene; want a cleaner environment of the supermarket and no longer find the wet market convenient.

3.1.2 Drivers for Change

The growing affluence of the Asian consumer is their changing lifestyles. The following table provides some examples of the needs that are arising as a result of changing lifestyles.

<table>
<thead>
<tr>
<th>Driver</th>
<th>Needs</th>
<th>Result</th>
</tr>
</thead>
</table>
| • More double income families  
• Longer working hours | • Convenience becomes increasingly important | Increase in:                                            |
|                             |                                         | • Hypermarket (one stop shops for everything).          |
|                             |                                         | • Convenience stores                                    |
|                             |                                         | • Consumption of refrigerated/packaged goods            |
| • More disposable income    |                                         |                                                         |
| • Increased exposure to advertising | Quality becomes a key demand            | • High end stores for branded goods                     |
|                             |                                         | • Market segmentation                                   |
|                             |                                         | • Range of goods available at the market.               |
3.1.3 Shopping and Buying Behaviour

In any given week 42% of Asian consumers shop once per week, 37% twice per week, 14%, three times per week and 7% four times or more. On average, consumers in Asia shop twice per week.

In relation to days of the week that consumers shop the visits are noticeably skewed towards the weekend. The latest research reflects that 19% of consumers shop on Monday, 22% on Tuesday, 28% on Wednesday, 19% on Thursday, 27% on Friday, 41% on Saturday and 38% on Sunday.

Over a week the time of the week most visited is in the evening. The consumer visits 20% of the time between 10am and 12pm, 33% of the time between 12pm and 4pm and 64% of the time in the evening, 4pm to 9.30pm.

3.2 Logistics and Distribution

Infrastructure development, new channels of distribution and the emergence of professional retailing are the key drivers to allowing more products to be within the reach of consumers. Logistics and physical transportation are improving rapidly with infrastructure development.

- Over the next ten years, approximately US$2 trillion will be spent in Asia on infrastructure development.
- Roadways/bridges and power will be the largest categories of infrastructure spending, accounting for approximately 30% of the total.
- Railways, airports and ports will also be areas of significant spending.

The emergence of new forms of distribution is also making a significant impact on distribution development. This includes direct marketing, the internet, television and home shopping.

Rising incomes and demographics is not driving the consumer explosion alone. Consumer sophistication, awareness and access are also expanding exponentially. Based on income growth, retail sales will almost triple over the next ten years. Sales are expected to increase from US$ 640 million in 1985 to a projected US$ 1817 billion by 2005.
4. Implications for Partnerships and Alliances

Consumer products firms and retailers face a range of new challenges. The need stems from the challenges created by the ongoing evolution of the consumer market and intense competition. This is detailed below.

<table>
<thead>
<tr>
<th>Consumer Products</th>
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<tbody>
<tr>
<td>• Improve productivity</td>
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<tr>
<td>• Improve logistics and distribution efficiency</td>
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<tr>
<td>• Improve operational processes eg. reduce overhead/cost duplication</td>
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<tr>
<td>• Develop effective sales and marketing programs to support growth.</td>
</tr>
<tr>
<td>• Retailer alliances</td>
</tr>
<tr>
<td>• Develop effective IT systems to support operations</td>
</tr>
<tr>
<td>• Have effective HR programs for recruitment, hiring and training</td>
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<table>
<thead>
<tr>
<th>Retailing</th>
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<tbody>
<tr>
<td>• Improve operational processes eg.</td>
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<tr>
<td>– Improve POS systems</td>
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<tr>
<td>– Improve stocking/warehousing systems</td>
</tr>
<tr>
<td>– Improve sourcing/inventory control</td>
</tr>
<tr>
<td>• Develop effective IT systems to support operations</td>
</tr>
<tr>
<td>• Improve contribution eg. maximise returns/space, R.O.I.</td>
</tr>
<tr>
<td>• Develop effective sales and marketing programs to support growth</td>
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<tr>
<td>• Have effective HR programs for recruitment, Hiring and training</td>
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</table>

4.1 Changes in Manufacturing and Distribution

They’re two significant enablers in the food and agribusiness sector. The first is **trade liberalisation**. Influential trade bodies are set on a path of deregulation. World trade growth is double world production growth. Imports are increasingly substituting domestic production. Asian trade flows are worth in excess of US$ 1.1 trillion with Japan being the largest importer of food in the world.

The second major enabler is **global communications**. E-commerce is transforming communications and business processes across the world. Distance is now not an impediment to world trade. Supply systems can be collapsed and integrated and business possibilities are endless. Technologies are converging in the home. Television, computer and phone are becoming one. Advertising channels are fragmenting with global pay television and the web competing with free to air.

Asia is seeking a major growth in the development of media intermediaries causing greater media penetration. Approximately 368 million households in Asia have televisions. Expected to increase to 480 million by 2003. Growth of satellite and cable is increasing significantly. Star reaches 54 million households and CNN reaches 16 million households in Asia. Advertising expenditure has increased from US$ 11 billion in 1989 to approximately US $40 billion in 1998 (excluding Japan).

4.1.1 The Changing Power Points

For the retail sector the world is their oyster. For processors/manufacturers however they have to scramble for least cost supply points. For both parties their industries are concentrating into fewer hands. Product or service line reporting relationships is replacing geographic organizations. Manufacturers are rationalising brands and factories across previously protected national boundaries. The “Euro Currencies” are removing the exchange rate risk. The global players are buying the local organizations. Global products, global brands, power brands are both retail and producer.

Whilst the food economy is in sound condition all is not the same as it was. Food manufacturers are experiencing significant GDP growth and constant low inflation translates into low if any food price increases. Productivity improvement is continuous. The Global Village is reducing the importance of national boundaries and raising the role of regional economies.” Clusters” are a consequence. Within
the Asian and Pacific Bloc there is wide disparity of food expenditures as a percentage of consumer spending. In the developing countries over 45% of their food budget is spent on food, whilst in the maturing nations between 25-45% is food related and in mature markets less than 24% is spent on food. In fact the free market economies are accelerating the “Haves” and “Have Nots”.

As a result there has been a dramatic change in the environment for manufacturers.

<table>
<thead>
<tr>
<th>Product Sourcing</th>
<th>Sales and Marketing</th>
<th>Distribution</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Old paradigm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Low quality local production</td>
<td>• Dedicated players (Nestle, Unilever)</td>
<td>• Winners develop scale &amp; reach despite highly fragmented markets and poor infrastructure</td>
<td>• Fragmented &amp; unsophisticated players</td>
</tr>
<tr>
<td>• High quality/high cost imports</td>
<td>• MNC’s using distributors</td>
<td></td>
<td>• Mom &amp; pop outlets</td>
</tr>
<tr>
<td></td>
<td>• Unsophisticated local players</td>
<td></td>
<td>• Property development as rationale for entry into large scale retail</td>
</tr>
<tr>
<td><strong>New paradigm</strong></td>
<td>• Focus on lowering cost &amp; increasing quality</td>
<td>• Increasing sophisticated sales &amp; marketing approaches required to create differentiation</td>
<td>• Professionalism, segmentation focus &amp; concentration driven by international retailers</td>
</tr>
<tr>
<td>• Scale justifies MNC manufacturing</td>
<td>• Key account management replaces large low-skilled sales force</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reduced tariff barriers and make markets more accessible</td>
<td>• Retail concentration &amp; segmentation drives emphasis on Just In Time (JIT) and inventory/current asset management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Rising capability of local firms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Manufacturing economics &amp; supply chain management strategy a key source of competitive advantage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In conjunction with this paradigm shift, competition has greatly intensified. The range of manufacturers has grown exponentially in both numbers and sophistication since the mid 1980s.
The following table puts this into perspective.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional market leaders</strong></td>
<td>Dominant players in modern consumer segments</td>
<td>Begin to face intense competition from local players at the low-end</td>
<td>Begin to face competition in higher-end product segments</td>
<td>Facing competition from local challengers and MNC latecomers in almost all segments</td>
</tr>
<tr>
<td>Lever Nestle Phillips Singer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Local challengers</strong></td>
<td>Emergence of weak local players as modern consumer lions</td>
<td>Begin to dominate low-end market via low cost local production</td>
<td>Begin to expand into other segments on the back of scale of economies and technology development</td>
<td>Strong respective local markets and expanding rapidly into other regional markets</td>
</tr>
<tr>
<td>President CP Samsung/ LG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MNC Latecomers</strong></td>
<td>Limited presence via distributors if at all</td>
<td>Build up presence via growing distributors</td>
<td>Begin to build dedicated sales and marketing capability</td>
<td>Expanding presence via establishment of regional manufacturing bases</td>
</tr>
<tr>
<td>P&amp;G Kraft Sony Whirlpool Panasonic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.2 Changes in Retailing

In a recent survey of 300 of the leading European grocery retailer executives a number of questions were asked about the future of retailing.

- What percentage of today’s retailers will be in existence in 2005? 63% said less than 50%.
- Who will own most of the stores in 2005? 65% said large global retailers.
- If you were not in the food business, would you invest 50% of your personal wealth in food retailing, today? 52% said definitely not.
- By what date will consumer-direct sales represent 20+ per cent of “retail” volume? 20% said by 2005 and 48% said by 2010.

This highlights the significant trend of retailers to go global and concentrate their efforts of expansion away from Europe into Asia.

Professional retailing is emerging and contributing to distribution development in the Asian region. The entry of international retailers such as Makro, Carrefour, Dairy Farm International, Wal-Mart and Royal Ahold and has hastened this development.

In addition, the advent of category specialists such as Toys R Us and Office Depot have also helped in this. There are many reasons for this.

<table>
<thead>
<tr>
<th>Push</th>
<th>Pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market saturation at home</td>
<td>Low retail concentration</td>
</tr>
<tr>
<td>Slow growth at home</td>
<td>Strong economic growth</td>
</tr>
<tr>
<td>Adverse demography</td>
<td>Pre-empt rivals</td>
</tr>
<tr>
<td>Competitive market place</td>
<td>Large population</td>
</tr>
<tr>
<td>High cost structure at home</td>
<td>High population</td>
</tr>
<tr>
<td>Strict planning regulations</td>
<td>Gain economies of scale</td>
</tr>
<tr>
<td>Shareholder pressure to grow</td>
<td>Relaxed regulatory environment</td>
</tr>
<tr>
<td>Company ethos to go global</td>
<td>Removal of entry barriers</td>
</tr>
<tr>
<td>“Me too”</td>
<td>Suitable acquisition targets</td>
</tr>
<tr>
<td>Financial markets encourage expansion</td>
<td>Favourable cost structure</td>
</tr>
<tr>
<td>Political instability</td>
<td>Diversify to spread risk</td>
</tr>
<tr>
<td>Leverage supplier relations</td>
<td>Access to new capital</td>
</tr>
<tr>
<td>Transfer know-how and extend core competencies</td>
<td>Favourable exchange rates</td>
</tr>
<tr>
<td></td>
<td>Improved international communications</td>
</tr>
</tbody>
</table>

The move of the retailers to consolidate and globalise is led by a change in the international environment. The forces for change are low growth, saturated markets, de-regulation, new technology and logistics. The result is consolidation and the implications are a shift in power, increase in private labels, innovation and leadership.

There are now 10 Mega-retailers, Wal-Mart; Metro; Royal Ahold; Promodes; Carrefour; Aldi; Tesco; Auchan; Delhaize, Lion and Dairy Farm International. The characteristics of these companies are that they are:

- 70% family owned and/or family controlled.
- Predominantly European-based.
- Mainly growing rapidly through acquisition.
- Generally buy companies “in good repair”.
- Generally operate multiple formats.
• Extracting economies of scale has often proved difficult.
• Challenge of managing across cultures.

There is a clear shift in power to the retailer.

The power is moving to larger retailers with a rapid rise in the number of US$20 billion + retailers. There is a move from national to global and local to regional to national. The retailers are commencing global promotions. The leading retailers are lowering their prices but at the same time increasing profits.

The other major trend is the strong growth in private labels and in particular the emergence of the store as a brand. Retailers recognise that they are selling a package and focusing on image, quality and consistency. The leading retailers are developing global scope and transnational private labels.

Retailers are driving innovation and attempting to capture more of the available consumer dollar/margin pool from the manufacturer. They are doing this by developing new products (chilled prepared meals), new formats (metro/neighbourhood gas station) and new services (one-stop-shop and banking).

Supply chain management is becoming a key feature of the retailers’ focus. The key to this is choosing the right partner. The importance of you to the partner and the partner to you is the key to ensure win/win situations.

<table>
<thead>
<tr>
<th>High Importance Of us to them</th>
<th>Commercial clout</th>
<th>Symbiotic Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual Promiscuity</td>
<td>At Risk Margin Pressure</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of them to us</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>

Over the next decade retailing will not be same. All those in the food chain must take the following trends into account. This table illustrates next stages in our food industry.

<table>
<thead>
<tr>
<th></th>
<th>Upwards</th>
<th>Neutral</th>
<th>Downward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers</td>
<td>Safety</td>
<td>Variety</td>
<td>Price</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Convenience</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formats (in mature markets)</td>
<td>E-commerce</td>
<td>Supermarkets</td>
<td>Hypermers</td>
</tr>
<tr>
<td></td>
<td>Convenience</td>
<td></td>
<td>Cash and Carry</td>
</tr>
<tr>
<td></td>
<td>Specialty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Companies</td>
<td>Global (just 3-5 years)</td>
<td>National</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Niche</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A further example of this is in Asia as the next table illustrates.

<table>
<thead>
<tr>
<th>Product Mix</th>
<th>Retail</th>
<th>Systems</th>
<th>Players</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Old paradigm</strong></td>
<td>Concentration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mainly domestic</td>
<td>Fragmented eg. mom and dad stores and stand alone stores</td>
<td>Simple sales inventory and account systems eg. money buckets, manual cashiers.</td>
<td>Traditional local</td>
</tr>
<tr>
<td>Clear distinction between local and foreign brands and channels</td>
<td>Wet market</td>
<td></td>
<td>Wing On (HK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lane Crawford (HK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Central (Thai)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rustans (Phil)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Giant (M’sia)</td>
</tr>
<tr>
<td><strong>New paradigm</strong></td>
<td>Proliferation of chain stores</td>
<td>POS systems eg barcoding systems</td>
<td>Traditional locals</td>
</tr>
<tr>
<td>Mix of domestic and imports</td>
<td>Emergence of supermarts</td>
<td>Computerised inventory mgt.</td>
<td>MNC entrants</td>
</tr>
<tr>
<td>Emergence of house brands</td>
<td>Emergency of category specialists</td>
<td>Computerised payment &amp; a/c systems</td>
<td>Makro</td>
</tr>
<tr>
<td>Rising roles of local brands</td>
<td>Branded retail</td>
<td></td>
<td>Carrefour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wal-Mart.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ahold</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Local newcomers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Giordano</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Watson’s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Optical Shop</td>
</tr>
</tbody>
</table>


It is predicted that consumers within ten years will only wish to spend eight minutes preparing for the evening meal. At present we spend approximately 15 minutes in the kitchen. This is in comparison to one hour in 1974 and over two and a half hours in the early nineteen thirties.

This has significant consequences to the types of meals we will be eating. For instance no longer is the traditional meal in vogue. We now are seeking fresh and frozen meals and even home delivery.

### 4.3 Changes in the Farm Sector

The number of farms all over the world is diminishing sharply and will continue to do so as economic activity increases. However relative to the manufacturing and retailing sectors the agricultural sector continues to be dominated by small-scale businesses that continue to produce via marketing groups, associations, cooperatives or government authorities. They rely very much on independent relations with buyers, merchants, intermediaries, processors and agents.
5. Increasing Awareness of Health and the Environment

5.1 Changes and Developments in International Trade

The rapid globalisation of markets, concerns over food safety, the dismantling of traditional investment and trade barriers, and the emergence of private labels is resulting in many changes and developments in today’s International Food Trade Environment.

These events are having an impact on rules and regulations concerning:

- Product quality
- Product safety
- Environmental, ecological, ethical and social issues
- Regulatory requirements

For example:

- Never has the safety of our food come under such scrutiny with continuous media coverage.
- Customers are becoming better educated and informed about hygiene and health risks.
- Regulators are increasingly active in safeguarding the food we eat.
- Globalisation and the dismantling of trade barriers and the General System of Preferences (GSP) means countries will increasingly have to compete on a level playing field.
- Consumerism and the quality revolution are producing demands for safety, consistency of quality, convenience and value for money.
- Global sourcing of products and raw materials calls for uniformity of standards.
- Increased business liability makes brand protection a key issue for business.
- The emergence of private labels is transferring the responsibility for food safety and quality back onto the supplier.

Everyday the world food industry is faced with new problems; food scares, poisonings, GMO issues, product recalls, litigation and many more. These events affect public perception and cause retailers, insurers, shareholders and regulators to react accordingly. These reactions have consequences that pass down the whole food supply chain, resulting in a risk management industry worth more than US$12 billion world-wide and it is estimated that the HACCP sector alone is growing at 20% per annum. These events are changing the way we conduct the business of managing the food supply chain. If you do not react to meet your customer’s quality specifications and safety and/or regulatory compliance requirements, you may not be around in the future.

5.2 The Food Safety Challenge

It is increasingly difficult to escape media coverage when it comes to food safety issues. Newspapers are constantly full of negative coverage. The world is becoming a smaller place in which to do business and source products for global brands. All this is occurring against a backdrop of increasingly affluent and mobile consumers all expecting the same food quality and safety standards worldwide. What happens in your own country will be known by all countries. If you cannot get quality right at home, how can you expect to convince overseas markets and consumers?
For example:

The Bangkok Post 12th September, 1996: “Pesticide Laced Vegetables”

- 100,000 tons of pesticide-laced vegetables from Tak province were being sent to Bangkok and regional markets. This finding is not new. Other unpublished data shows that chemical residues have been reported to be 20 times higher than World Health Organisation limits in fruit and vegetables.
- Public health officials revealed that up to 68% of farm workers had chemical residues in their blood. Thirty per cent of these were in the risky to high category. The question this prompts is that if farmers cannot read the safety instructions and chemical labels, how will they know what the appropriate dose rate and withholding periods are prior to harvest?

The Bangkok Post 26th March, 1997 – “E. Coli Found in 70% of Food Samples.”

- It is well known that food borne illnesses are widespread and accepted as a way of life in Thailand. Tens of thousands of deaths result from food borne illnesses annually and hundreds of thousands of tourists spend their holidays recovering from digestive upsets and food poisoning.


- A survey of supermarkets in which the supermarket names were not mentioned reported the following findings;
  - Formaldehyde - A Carcinogenic substance used for preserving bodies was found on fish and crustacean in supermarkets city-wide being used to preserve shelf life.
  - Nitrate - Also a carcinogenic substance, contains lead. Is commonly used as a colouring agent to give pork, beef and chicken a reddish appearance.

Borax, Coliform bacteria and pesticides were also detected.

These few examples are only the tip of the iceberg and give a real indication of the risk and challenges that the Food and Agribusiness industry faces. The examples can go on to include; the BSE issue in the UK, salmonella in eggs in Europe, E-coli outbreaks in the USA, Europe and Australasia, the chicken virus in Hong Kong, GMO issues in Europe, hormonal growth promotents in meat, expired products being recycled, chemical contamination, arsenic in chicken meat, antibiotics in milk, parasites in food and unhygienic food preparation standards. The list is almost endless and in many instances these problems are associated with huge damages and legal costs.

Poor education and awareness of food safety issues at the farm gate and among processors, packers, retailers and catering establishments, combined with the lack of recognised quality standards, poor implementation of control procedures and a poor legal system in developing countries to enforce regulations, mean that the quality and safety of the food industry rest in the hands of the private sector. There is a definite move from the old end-of-line product inspection approach (often by government inspection agencies) to a new environment of a Quality Assurance approach where the supplier assumes responsibility for safety. This means that food safety needs to be managed along the entire supply chain from paddock to plate. This is the Food Quality Safety Challenge.

5.3 Private Labels, Marks and Brands

We are entering a new era of consumer awareness and concerns. More and more producers, processors, manufacturers, retailers and caterers are responding to this and are turning their attention to meeting consumer perceptions and requirements. This requires the design of products and services to meet consumer requirements. It is a major shift from the old “commodity” mentality of production at all costs and then worrying about finding a market later. The new approach is about transforming
commodities into products known as the Value Added Concept. Companies that appreciate and react to new consumer concerns will reap the most benefits. These market forces will lead to the increased emergence of private labels, international marks and brands that consumers can trust – products that signify a higher degree of safety, consistency, predicability and value for money.

Research into the Food and Agribusiness industry indicates the importance of:

- Brand image
- Brand loyalty
- Good public perception

Quality assurance is the best way of achieving all three.

Without an effective quality management system companies are at risk of producing defective and contaminated goods that can lead to food poisoning, damaging public recalls, huge legal costs, loss of public image and market share.

Some of the characteristics of successful marks, brands and private labels include:

1. Conformity to a recognised standard by objective assessment.
2. Independent certification by an accredited body.
3. International recognition of the certifying body.
4. Recognition by regulatory and statutory bodies.
5. A network to enforce and protect the mark against fraud and abuse.
6. Promotion of the mark.
7. Tangible benefits to the consumer.

Examples of Product Branding Attributes could include:

- Conforms to Codex HACCP Guidelines for safety, e.g. SQF 2000™
- Origin, place to manufacture, assembly or packing imprinted.
- Contains less than a specified amount of nominated substances.
- Complies with product specifications; e.g. taste, texture, size, shape or other quality attributes.
- Organic – grown under conditions specified in organic definition.
- Chemical residue status – tolerance levels for pesticides, herbicides, etc.
- Ecological – grown under certain environmental conditions.
- Healthy Lifestyle perception; e.g. free from salt, low fat.

Delivering quality and safety in food to customers in world markets is a tall order. It requires special skills, systems and attention to detail.

For example, large international retailers and supermarket chains now insist that fruit, vegetables, meat and other products be quality endorsed. Independent inspection companies like SGS are playing a key role in helping to implement their programmes.

5.4 Quality Standards

The major issue confronting the global trade in food is the need for stakeholders to agree on standard approaches to food safety and quality (HACCP). The number of standards and guidelines for food in the market today is growing exponentially and imposing huge costs and confusion on the supply chain. Different buyers are imposing in-house HACCP/QA schemes on suppliers as they or the governments in the countries from which they operate do not understand, relate to or accept local standards initiatives.

As a result of this, internationally recognised standards such as ISO 9000, ISO 14000, SQF 2000™ and others will continue to be developed to formalise systems that will;
• Provide uniformity and standardisation
• Prevent duplication of standards
• Provide a level playing field

These standards will encompass product and service quality as well as safety, environmental and social issues and will eventually become common terms of trade.

As stated before, these standards will be promoted and insisted on by:

• Customers
• Government and legislation
• Shareholders and investors
• Financiers and bankers
• Insurance sectors
• The supply chain

In the Food and Agribusiness industry such standards already exist and include:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 9000</td>
<td>Internationally recognised world-class quality management system.</td>
</tr>
<tr>
<td>HACCP (Codex)</td>
<td>Hazard Analysis Critical Control Point. A process for managing food safety.</td>
</tr>
<tr>
<td>SQF 2000&lt;sup&gt;CM&lt;/sup&gt;</td>
<td>Safe Quality Food 2000. A standard designed specifically for the industry to manage food safety and quality based on Codex HACCP and compatible with ISO 9000.</td>
</tr>
<tr>
<td>EMS-ISO 14000</td>
<td>An international environmental standard which sets guidelines for clean and more sustainable processes and production techniques.</td>
</tr>
</tbody>
</table>


5.5 Managing Risk

Risk will change as consumer perceptions change.

What is tolerated and acceptable today will not necessarily be acceptable in the future. As consumers become better educated, made more aware through improved communication and become more affluent, their perceptions and buying patterns will change. This is what changes markets.

The question this raises is: “How do we manage these types of risk?”

The answer is- By building quality and safety into the product using HACCP techniques to determine the critical points and then incorporating this into an auditable quality management system to ensure that the preventative controls and corrective actions are implemented.

If your customers ask you to prove that you have an appropriate system in place to ensure:

• Product specifications are met.
• Consistency and predictability is maintained.
• Regulatory compliance is fulfilled.

HOW WILL YOU PROVE THIS?

With SQF 2000<sup>CM</sup> (Safe Quality Food) – a standard that provides a useful option to manage food safety risk and to build-in product quality.
5.6 What is SQF 2000\textsuperscript{CM}?

SQF 2000\textsuperscript{CM} (Safe Quality Food 2000\textsuperscript{CM}) is a HACCP quality code designed specifically for the Food and Agribusiness industry. The code is aligned with the Codex Alimentarius Commission Guidelines for the application of HACCP. SQF 2000\textsuperscript{CM} focuses on food safety and quality issues and is compatible with ISO 9000. The benefits of SQF 2000\textsuperscript{CM} are:

- It is designed for the Food/Agri-industry
- It encapsulates Codex HACCP
- It is compatible with ISO 9000
- The system is voluntary and contestable
- Food Safety/Quality issues are becoming paramount with increasing globalisation
- It addresses quality issues in addition to safety issues
- Use of the SQF 2000\textsuperscript{CM} Mark on products
- The SQF 2000\textsuperscript{CM} Mark provides a “Seal of Approval” that demonstrates that your product has been produced under a HACCP based quality system.

By utilising SQF 2000\textsuperscript{CM} there will be a system in place that can be audited to prove that the produce meets relevant standards for safety and hygiene and prove to that it meets the high standards that both the consumer and the regulatory requirements demand. There will be an established a system that ensures that a consistently safe produce, quality food products, that will save money in the long run and prevent costly food recall or liability problems. Finally, using the widely recognised SQF 2000\textsuperscript{CM} Mark, will assist in the branding and promotion of produce.
6. Technological Advances in the Food Industry

The new trends in food agribusiness have a significant impact on supply chain management and the parties involved. Biotechnology is the most recent and impacting for many years.

6.1 Biotechnology

Being able to tailor new crops and animals by direct genetic manipulation, involving single genes or small number of gene insertions, rather than having to rely on more traditional random processes of hybridisation and breeding – where large numbers of genes get moved about – would seem to most people, on the face of it, to be a rather good thing.

The new technologies that now allow improved genetic modification, however, have generated a fierce debate, increasing hostility – and direct action by protestors in some countries. The heated arguments ‘for and against’, which some people refuse to even describe as a meaningful debate, have become increasing polarised and politically charged – especially in Europe.

Genetic modification by gene transfer, between species, has allowed the creation of a very wide range of new transgenic, genetically modified, organisms (GMOs). Genetic transformation is only one facet of modern biotechnology, but unfortunately these terms are sometimes used quite loosely – and often equally and inappropriately criticised.

The first crop to be genetically transformed was tobacco (1983), to provide virus resistance, and this is now grown extensively in China. In the western world, so-called, there was no commercial exploitation before 1990 – but by the end of this year it is estimated that more than 40 million hectares globally will be occupied by GM crops (Economist 1999). Much of this development is taking place in North America – where GM maize, soyabean, cotton and rapeseed are now being grown on considerable areas.

Europe is different. Although nine varieties of GM crops have reportedly been approved by the European Commission for planting or import since 1994, national governments in the EU and the public have generally resisted adoption. But – Why?

Why should European attitudes, and fears, be so different to those in North America? What is there to be afraid of? Can the public be persuaded in Europe of the value and benefits of biotechnology? If so – how? If not – what will be the possible impact on European economies and international trade? Will we see new sectoring in the marketplace perhaps of not only ‘organic’ types and ‘conventional’ foods – but the latter being further split into GM types and ‘non-genetic’ foods? In the past the use of food irradiation; growth promoting hormones in animals, and BST have been rejected in many countries - what will now be the future for GM technologies?

6.2 What is Modern Biotechnology?

In contrast to the traditional biotechnology-based processes which have been exploited for many years by man, based on the utilisation of whole organisms or parts of organisms and their products, such as in brewing, baking or cheese making – modern biotechnology exploits specific genes which have been identified and transferred into particular organisms. Unlike traditional breeding, where desirable characteristics are accompanied by the more random transfer of hundreds of genes, modern biotechnology can be much more targeted and exact. For the first time opportunities also exist to transfer genes between species and kingdoms.
Table 1: The Nature of ‘Modern Biotechnology’

| How does genetic engineering differ from conventional plant and animal breeding? |
|-------------------------------|-----------------------------------|
| Genetic Engineering           | Traditional Breeding              |
| Fast process (normally weeks) | Sow process (often years)         |
| Precise (involving single or few genes) | More random (parents contributing possibly thousands of genes) |
| Desirable genes transferred (undesirable genes can be removed before transfer) | Many unidentified (sometimes undesirable genes with unknown) gene products are transferred |
| Clearly defined genes, which are generally well characterised can be transferred | Less defined genes are often transferred |
| Isolated genes can be ‘marked’ for early recognition of changed offspring characteristics | Large number of genes cannot be marked and easily monitored |
| Capacity to introduce ‘foreign’ genes and to overcome species (and Kingdom) barriers – with considerable potential | (No equivalent comparison for ‘foreign’ – gene exploitation) |

6.3 Genetically Modified Product Development

The present phase of GM product development, which can be regarded as a first wave, is providing products with mainly agronomic traits of benefit to the farmer – such as herbicide tolerance and improved pest resistance. It is argued, however, that as a result consumers could still derive indirect benefits – such as the possibility of less expensive food from more efficient production systems, and from indirect environmental benefits due to less pesticide use. These claims are not yet widely proven. Poole (1998) emphasises the basic nature of the current early stage of GM development of mostly ‘easy’ targets, where a single gene can deliver the desired effect.

The most frequent traits currently being exploited globally (up to 1996) are herbicide tolerance (35%); food quality (20%); insect resistance (18%); and virus resistance (11%). The most frequent crops which are being transformed (up to 1996) are maize (33%); rape (21%); potato (11%); tomato (11%); soya (9%); and cotton (11%).

Statistics on the extent of GM crop production vary, but recent estimates (which exclude some countries, such as China) are provided in the following tables.

The rapid adoption of GM crops is reflected in Table 2. Table 3 shows the extent of GM crop production in 1998 in the USA, which is dominant globally. Some other countries, however, in particular Argentina and Canada (Table 4) are also becoming significant GM crop producers (Tripp 1999). There are reports of up to 40 million hectares of GM crops being grown globally this year (Economist 1999).

Table 2: GM Crop Production

<p>| Estimates of the Global Adoption of Genetically Modified Crops in 1998* |
|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th>Year</th>
<th>Area of Production (m/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>1.7</td>
</tr>
<tr>
<td>1997</td>
<td>11.0</td>
</tr>
<tr>
<td>1998</td>
<td>28.13</td>
</tr>
</tbody>
</table>

Table 3: GM Cropping in the US

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area of Production (m/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soyabean</td>
<td>10.93</td>
</tr>
<tr>
<td>Maize</td>
<td>7.93</td>
</tr>
<tr>
<td>Cotton</td>
<td>2.30</td>
</tr>
<tr>
<td>Oilseed Rape</td>
<td>2.14</td>
</tr>
<tr>
<td>Potatoes</td>
<td>0.024</td>
</tr>
</tbody>
</table>

*US House of Representatives Agriculture Committee (1999)

Table 4: Area of GM Crops (millions of hectares) (Tripp 1999)*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>0.1</td>
<td>1.4</td>
<td>4.3</td>
</tr>
<tr>
<td>Canada</td>
<td>0.1</td>
<td>1.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Australia</td>
<td>&lt;0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Mexico</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Spain</td>
<td>-</td>
<td>-</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>France</td>
<td>-</td>
<td>-</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>South Africa</td>
<td>-</td>
<td>-</td>
<td>&lt;0.1</td>
</tr>
</tbody>
</table>

*The table does not include China or Japan (James 1998)

Currently in the UK pipeline we have:
- Herbicide tolerant oilseed rape and sugar beet
- Modified oil synthesis in oilseed rape
- Virus tolerant potato
- Insect resistant maize
- Herbicide tolerant maize
- Fungal tolerant spring wheat
- Reduced pod shatter oilseed rape

None of these, however, are yet being grown commercially – but modified herbicide tolerant oilseed rape may possibly be planted on UK farms in the year 2000.

It is interesting to note – that although the government in Brazil have agreed to GM soyabean production, there is significant hesitation from farmers. Greenpeace has also launched a legal challenge in the courts to ban GM soya in Brazil – an action being defended by Monsanto. Supporters argue that GM soya can cut production costs on farm by 10% - but others argue that there will be a better priced, increasing market (if only in Europe), for non-GM soya in competition with GM farming in Argentina and the United States (Economist 1999 b).

The prospective second wave of potential products could provide products of greater direct benefit to consumers, such as improved quality and nutritional traits (Mathias 1998). These are already being developed, and are to a limited extent currently being adopted.

These could include:
- Soyabean with low rafinose, and a high oleic oil and high stearate oil content
- Oilseed rape with high lauric, stearate, oleic and GLA contents
- Maize with enhanced oil and protein contents
- Potatoes with a modified, and higher, starch content which take up less fat when fried
- Rice with higher vitamin levels, in particular vitamin A.

A third wave of products, already in the pipeline, are described by some as the ‘plants as factories’ phase – which could also include some second wave materials. These future phases, and opportunities, are considered to be among the most exciting prospects (Poole 1998). Examples given
are modified tobacco plants to produce albumen and growth factors; maize to produce monoclonal antibodies and feed enzymes, and GM oilseed rape varieties for producing modified fatty acids or beta-carotene. These GM crops will become the new industrial crops of the future. A good example, currently, is GM oilseed rape with modified oil biosynthesis which can subsequently allow potentially biodegradable plastic polymer production.

Other beneficial genetic modifications which would be difficult to achieve quickly by traditional breeding methods could include:

- **Yield stability benefits** - derived, for example, from such changes as better cold tolerance, salt tolerance or pH tolerance
- **Improved fruit** - better tasting with a longer shelf life, through delaying senescence
- **Reduced pollution potential** - improving wood pulp production from more processable material, or changed plant colours reducing dyeing requirements of fabrics

Mathias (1998) has highlighted the potential of plant biotechnology – emphasising the potential effects in particular of a single gene manipulation. He points out that the genetic difference between oilseed rape varieties producing oil suitable for human food use and varieties with oil suitable for manufacturing plastics is in the activity of one gene.

### 6.4 Contributions to Food Security

With the global population increasing by an extra 78 million people each year substantially more food will be needed in the years to come (Davies 1999). Enough food to feed perhaps 7.7 billion people in 2020, or 10.7 billion people by 2050, from today’s 6.0 billion (UN 1998). The increase of roughly 200 new people a minute will all need, and expect, to be fed – and should have sufficient access to enough food to lead a healthy and productive life (McCalla 1999). Absolute numbers of increasing population are less important, however, than the distribution – with some regions and countries coming under particular pressure, especially in South Asia and Sub-Saharan Africa.

Plant biotechnology approaches have the potential to make a significant impact on future food demand – and, in the view of some experts, can make a substantial contribution to tropical agriculture in particular in developing countries (Van Montague 1998). Higher yields; greater stress resistance, and more efficient use of crop inputs will be required – and biotechnology has the potential to provide these important objectives in a much shorter time frame than traditional approaches. Some of the recent contributions of biotechnology application to the improvement of rice have been highlighted (DFID 1999) – as a good example of potential impact on a major food source. The potential value of biotechnology to the developing world has also recently been emphasised by Sachs (1999).

### 6.5 Public Concerns

Public resistance to GM technology seems to focus on a complex of several concerns, including:

- Food safety
- Environmental impact
- Consumer choice
- Increasing ‘social’ misgivings, including:
  - The changing nature of modern agriculture and the food industry
  - Industry dominance of our food chain
  - Developing country worries
  - International trade issues
  - ‘Ethical’ consideration of ‘playing God’.
The hostility, in Europe, is also supported by:

- A lack of consumer trust in regulators
- A lack of public confidence in science
- A feeling of social exclusion from risk management processes
- A fear of ‘unaccountable’ multi-national company influence.

Within the ‘social’ misgivings, some believe that the adverse reaction to GM technology is not the main reason for public hostility. The GM target may be a proxy protest for those worried about the increasing industrialization of traditional farming, and loss of ‘traditional’ countryside. It may, and probably does, also provide an appropriate ‘whipping boy’ for organic enthusiasts – keen to expand the market sector for the ‘more healthy’ organic foods.

- Food Safety

Because of unfortunate legacies in Europe of food crises – heightened by governments being ‘economic with the truth’ on food safety and the non-disclosure of ‘inconvenient’ statistics – the public no longer wholly trust official regulators and government proclamations. There is an understandable deep-seated mistrust of not only politicians and regulators – but also science and scientists, as a result of frequent and diverse food scares. These scares have been serious – ranging from BSE/mad cow concerns, to lethal *E.coli* strains and salmonella contamination of animal products, to the potentially cancer-causing dioxin residues in meats in Belgium.

The use of antibiotic marker genes to more easily indicate successful transformation of a crop product is now officially discouraged, and no longer exploited by biotechnology companies. It was felt that there may be a risk of gene transfer to gut microflora, with associated difficulties of subsequent antibiotic treatment.

No (properly conducted) scientific tests have yet shown that GM foods are in any way toxic. It is sometimes suggested (‘light heartedly’), however, that 280 million Americans who have consumed trillions of GM food ‘doses’ over the last few years show no sign of abnormalities’ – but not everyone might agree!

- Environmental Worries

Recent polls, including a later mentioned IGD survey, have revealed a growing concern for possible adverse, maybe long-term, effects of GM cropping on the environment. An often reported reaction is ‘what will happen to the countryside if these alien genes escape?’ Some people in the UK seem as worried, if not more worried, about GM product releases into the countryside than food safety.

In some ways these ‘environment impact’ fears are easier to understand than those surrounding the so-called ‘Frankenstein’ food issues. The environment is very complex – and in the UK insufficient studies have been carried out to date to measure and evaluate potential impact. Studies in theory, and in the laboratory, and investigations in enclosed environments, cannot always be legitimately translated to the field – and this is accepted by manufacturers; the scientific community and government. The UK Government is requiring large scale ecology trials with GM crops to be undertaken (ACRE 1999; BBSRC 1999) – but almost all of these field experiments were vandalised by extremists during the 1998 and 1999 growing seasons. The so-called ‘eco-warriors’ do not accept the need to carry out these studies, and unfortunately (to date) the UK Government has felt it appropriate to freely publicise the exact location of each farm trial site. An exercise in ‘open’ government, which clearly favours (to date) an organized campaign of vandalism by extreme opponents.

There are several concerns – which, but not always in the public mind, differ in relevance according to the particular GM crop being considered.
Some worry about the possible persistence of GM crops when grown, as volunteer plants. It is known, for example, that oilseed rape (OSR) seed can survive up to 9 years in the soils in the UK – and that OSR can successfully invade hedgerows and waste land. What could this mean to crop rotation management and pesticide-usage patterns if herbicide tolerant GM OSR becomes a popular crop? Will there be a persistence problem and increased control costs on farms?

There are other fears about the possible outcrossing of GM crops with other species – to create a ‘superweed’ perhaps with herbicide tolerance. This will depend on many factors, and the practical significance of such a possible gene flow from GM crops is not yet understood.

In the UK, the pollen of oilseed rape can successfully cross and fertilise brassica relatives (such as the weed charlock) in the field – and with related crop species (eg Brussels sprouts). So can sugarbeet – at a low level – cross with the related sea beet. GM potato; GM maize; and GM wheat, however, are unlikely to give a ‘gene flow’ and a so-called ‘genetic’ pollution problem in the UK.

Possible indirect effects of GM crop adoption also have to be considered. Some are concerned about the possible impact of GM insect – tolerant crops on insect populations generally, and beneficial organisms in particular. For example, the potential toxicity of GM maize pollen when dusted on to a milkweed host of a butterfly was recently reported from a research group in the United States. The relevance of these controlled experiments, however, have been challenged.

- **Consumer Choice**

Consumers in the UK generally regard labelling of genetically modified foods as essential (Consumers Association 1997). In May 1997 the ‘Novel Foods and Novel Food Ingredients’ regulation, which followed an EU directive, made it compulsory to label some GM foods – that contain ‘residues of engineered DNA or protein’.

The labelling is intended (Consumers Association 1997) to give consumers ‘clear, honest and neutral information about the GMO origin of products’. It is a science-based approach, requiring labelling whenever the GMO origin can be scientifically proven.

In the USA, in contrast, the Food and Drug Administration decided in 1992 that as long as GM food is not ‘more toxic, allergenic or any less ‘substantially equivalent’ than standard counterparts it need not be separately labelled (Economist 1999). This decision is currently being challenged by some consumer groups in the US.

- **Social Misgivings**

Part of the anti-GM feeling may perhaps be ‘proxy protests’ for other concerns.

Some people clearly do not like, and may even hate, the way modern farming and the food industry has developed during the last fifty or so years – and is continuing to develop. They object to the intensification; chemical-use; heavy machinery; animal welfare; damage to the countryside – and the adverse effects modern farming has had (and is having) on wild life; biodiversity and the landscape. GM products – particularly those provided by large, ‘faceless’, maybe non-politically accountable, and possibly foreign based multi-nationals – are viewed as yet another evil.

Some people are concerned that poor countries in the developing world could be adversely affected by GM technology adoption – especially resource poor farmers, and possibly consumers in less well regulated societies.

Others fear possible adverse effects on international trade of a bar or restrictions perhaps on GM products (of certain types) from particular sources (Tripp 1999).

Quite a few people hold strong views about the ethics of transferring genes between species – especially between animals and plants. This perception of ‘playing God’ is unacceptable to some.
Different religions will probably view particular genetic transformations, if not whole techniques, as acceptable or not acceptable- and clearly this will have major influences on the potential GM impact, both in production and trade, in some parts of the world.

6.6 Early Consumer Responses

One of the first foods to be developed during GM technology was cheese (in 1991), produced using a genetically modified enzyme called chymosin. Instead of using rennet from a calf’s stomach, the chymosin is produced by genetically modified bacteria that contain a bovine gene – which codes for the enzyme and this is then extracted. This breakthrough of a ‘vegetarian’ cheese was launched in the UK by the Co-operative Society in 1993. It was labelled as ‘produced using gene technology and so free from animal rennet.’ For the first time vegetarians were able to enjoy hard cheese.

A survey by the Consumers Association in 1994 of how consumers felt about this new Co-op cheese, labelled as ‘produced using gene technology’, revealed (as might perhaps be expected) a low level of public understanding.

**UK Reactions in 1994 to GM ‘Vegetarian’ Cheese**  
*(Consumers Association 1997)*

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>%</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you heard of ‘gene technology’?</td>
<td>21</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Do you know what ‘gene modification’ means?</td>
<td>17</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Would you consider buying food produced using gene technology?</td>
<td>15</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

Since the development of the ‘GM vegetarian’ cheese, chymosin from the same source is now used extensively for hard cheese production. About 90% of hard cheeses in the UK are now thought to be produced using GM microbial chymosin. However, most of these cheeses are not labelled as being ‘produced using gene technology’ – as with the original product.

6.7 A Changing Consumer Reaction

Mounting critical coverage in the UK media recently and increasing GM concerns in the food industry prompted the Institute of Grocery Distribution (IGD), a research and education charity supported by project income and company membership subscriptions, to assess changing consumer reaction over the critical winter 1998 and spring 1999 period. Of the 2034 adults surveyed in 1998, 1158 (57%) responded – and in 1999 of the 1040 surveyed 909 (87%) responded.

Prior to this IGD study the Consumers Association found in April 1996 that only around 41% of UK consumers had some understanding of the terms ‘biotechnology’ or ‘genetic modification’.

25
IGD UK Consumer Survey (Woolven 1999)

6.1 Have you heard the term genetic modification in connection with food production?

<table>
<thead>
<tr>
<th>%</th>
<th>December 1998</th>
<th>March 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>57%</td>
<td>87%</td>
</tr>
</tbody>
</table>

6.2 To what extent are you concerned about the safety of eating ingredients from genetically modified crops?

<table>
<thead>
<tr>
<th>%</th>
<th>December 1998</th>
<th>March 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very concerned</td>
<td>13%</td>
<td>23%</td>
</tr>
<tr>
<td>Fairly concerned</td>
<td>21%</td>
<td>28%</td>
</tr>
<tr>
<td>No feelings either way</td>
<td>11%</td>
<td>16%</td>
</tr>
<tr>
<td>Unaware of GM</td>
<td>43%</td>
<td>13%</td>
</tr>
<tr>
<td>Not very concerned</td>
<td>6%</td>
<td>11%</td>
</tr>
<tr>
<td>Not at all concerned</td>
<td>6%</td>
<td>9%</td>
</tr>
</tbody>
</table>

6.3 What effect do you think genetically modified crops will have on the environment?

<table>
<thead>
<tr>
<th>%</th>
<th>December 1998</th>
<th>March 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very positive</td>
<td>2%</td>
<td>6%</td>
</tr>
<tr>
<td>Fairly positive</td>
<td>7%</td>
<td>13%</td>
</tr>
<tr>
<td>No effect</td>
<td>16%</td>
<td>15%</td>
</tr>
<tr>
<td>Unaware</td>
<td>43%</td>
<td>12%</td>
</tr>
<tr>
<td>Fairly negative</td>
<td>8%</td>
<td>21%</td>
</tr>
<tr>
<td>Very negative</td>
<td>8%</td>
<td>17%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>16%</td>
<td>16%</td>
</tr>
</tbody>
</table>

6.4 What do you think, if any, are the possible risks or drawbacks of genetic modification of crops? (only asked by IGD in December 1998)

<table>
<thead>
<tr>
<th>Risk</th>
<th>% (1158 sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>45%</td>
</tr>
<tr>
<td>Environment</td>
<td>24%</td>
</tr>
<tr>
<td>Consumer</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>12%</td>
</tr>
<tr>
<td>No risks</td>
<td>5%</td>
</tr>
</tbody>
</table>

This survey revealed that by March 1999 many more people in the UK were aware of GM issues – and, much more significantly, more people were concerned.

6.8 A Retailer’s Recent Experiences

Two major supermarket retailers in the United Kingdom, Sainsbury and Safeway, developed in 1995 and successfully launched in February 1996 a new tomato puree product – derived from the genetically modified, longer storage life (slower to soften), ‘Favr-Savr’ tomato.

Not knowing how customers might react to a GM product – particular care was reportedly taken by Sainsburys in particular to provide clear labelling supported by information leaflets in each store, and the new tomato puree was displayed on shelves alongside alternative traditional products. Considerable efforts were made to ensure the new product launch was completely ‘transparent’ to customers – through appropriate labelling of containers and shelves with supporting, more detailed, product information, and customers were given a choice.
The new GM product was improved in providing a thicker consistency and greater convenience than traditional puree. As a result, it met consumer expectations and was initially very successfully. Significant quantities of the GM tomato puree were sold – over 1.6 million cans (according to Poole 1998) – sales exceeded the ‘conventional’ traditional products for a period of time. It also has to be said, however, that the new GM product was slightly cheaper.

The retailers concerned, and others in the food industry, began to feel that consumers accepted GM products and that the market would grow. In 1996, the launch year, sales of the new GM tomato puree exceeded the traditional alternatives by 30%. In 1998 the sales were similar to 1996, but by early 1999 GM puree sales were lower than the alternatives. In 1996 in the UK there was some opposition to biotechnology from pressure groups, but coverage in the media was low – and there appeared to be only a low level of interest and concerns from consumers generally. There was, at that time, only a modest level of public understanding (Consumers Association survey).

Consumer attitudes changed markedly with food safety crises and concerns, and with increasing hostility from anti-GM pressure groups and frequent adverse coverage in the UK media. The public also became increasingly concerned about the greater number of foods containing GM material, as a result of the more extensive use of genetically modified commodity crop products such as GM soya protein. It’s been estimated that approximately 60% of processed foods contain soya, and some of these genetic foods began entering European Union food markets in 1996 (Consumers Association 1997).

By the autumn of 1997 more and more concerns were being expressed in the media about the increase in GM food products in the UK – and our exposure to ‘new genetic technologies’ through food. Soya was not being segregated in North America, and as a result it was not possible to clearly label GM products at the time. No choice for consumers! All of which began to generate a lot of concern in food manufacturing and with retailers – as well as with consumer associations.

Alison Austin, a senior manager responsible for food safety and environment management, recently described (at an IGD meeting) the changes in UK consumer reaction to ‘genetic foods’ leading to their withdrawal at Sainsbury’s Supermarkets.

6.9 Consumer Reaction to GM Foods

1. In 1998
   - A few customer queries in early Spring 1998 grew to 200 telephone calls a month, on a dedicated ‘Freephone GM’ information line, by the summer.
   - A scary TV documentary, ‘World in Action’ in August resulted in 900 concerned telephone calls a month.
   - Sainsbury decided to reduce their exposure to GM criticisms and customer concerns in the autumn. They identified and individually labelled 50 separate food product lines, known to contain GM materials (including soya protein; oils; lecithin; maize; tomatoes).

2. In 1999
   - Customer concerns and contacts with Sainsbury’s, increased substantially in 1999 – following highly critical articles in major UK newspapers (particularly the Daily Mail; the Daily Express and Independent) and questions to the Prime Minister in Parliament from constituency MPs.
   - In February the ‘Freephone GM’ line, set up by Sainsbury’s, received 10,500 customer calls!
   - Following which the decision was made to completely eliminate GM ingredients from Sainsbury-sold food products, as soon as possible.

3. Future Company Strategy

For lower exposure to customer criticism and greater long term security, Sainsbury’s decided:
• To agree, with others, common standards for non-GM product verification to be able to put in place a recognised assurance scheme.
• To secure long-term supplies of guaranteed non-GM food ingredients. A process which is involving visits to a number of countries, such as Brazil, which could produce sufficient quantities of non-GM foods.
• To support the development of an international ‘consortium’ for sourcing non-GM foods that could provide more significant buying power from the aggregate demand, and sustainable supplies of appropriately priced produce.

4. Future Customer Care

Recognising the increasingly competitive need to retain trust.
• To continue to provide ‘Freephone Careline’ phone lines for customers.
• To increase customer contact in stores, particularly through information stewardship.
• To undertake on a more regular basis ‘early warning reports’ from stores of customers’ particular concerns.
• To establish a more comprehensive logging and tracking system of products from suppliers and sales.

5. Future Approaches to New ‘Food’ Technology Introductions

An increasing need to answer the questions:
• What are the customer benefits?
• Where is the transparency?
• Where is the choice?
• Who carries the risk?

6.10 Cultural Differences in Consumer Reaction

GM technology in agriculture and the food industry has been most rapidly and easily adopted in North America, in marked contrast to Europe.
Several possible reactions have been put forward for this difference, including:

• Greater overall consumer trust in Government regulatory systems in the United States, in particular the Food and Drug Administration (FDA) and Environment Protection Agency (EPA).
• Less understanding perhaps in the United States, amongst consumers, of the nature of biotechnology.
• Greater trust by the American public of science.
• Greater dominance of political pressures over science in decision-making in Europe.
• A greater legacy of food safety crises in Europe and perhaps other crises-leading to greater demands for ‘safety’, ‘assurance’ and appropriate labelling. Not only such difficulties as BSE/mad cow disease more recently – but also possibly the unfortunate legacy of such traumas as thalidomide damage.
• Greater European scepticism of reassurance from governments and some sectors of the food chain.
• Less emphasis, to date, on independent food safety advice to governments in Europe.
• Different roles for food in European cultures than in America.
• Differences in European landscapes; biodiversity issues and farming practices to North America – regarding GM crop adoption.
• Different responses to large multi-national company influences on the food supply chain.

We are clearly different, for lots of reasons and these differences also exist across Europe in relation to GM perceptions and fears, as much as differences with the United States.

Eurobarometer surveys by the European Commission, undertaken annually to assess consumer reaction (since 1973), reveal significantly different reactions to genetic modification in the European
Union. There was a high level of agreement, however, in a recent Eurobarometer (1998) survey for appropriate labelling to indicate GM material in a food product. The overall ‘agree’ score for the 15 European Union countries, for this question, was 86% - with France the highest at 92% and Portugal the lowest at 69%.

There was even a good, but slightly lower, level of overall agreement across the European Union for labelling for the ‘probable presence of GM material’.

6.11 Improving Consumer Confidence and Salvaging the Bio-Revolution

Most consumers in the UK have some concerns about GM technology and genetic foods now, thanks in particular to adverse media coverage. Regaining and re-building trust is clearly much more difficult than approaches to establish consumer confidence initially. In complex food chains consumer confidence can be gained or lost at any stage – from production to consumption – requiring a comprehensive and integrated approach to the whole production process.

• The Biotechnology Industry

Consumers need to be convinced that new technologies are of benefit to them personally, particularly in countries where there is an abundance of relatively inexpensive foods – and considerable choice. The current phase of GM crop adoption, described as agricultural biotechnology, is mainly providing herbicide and insect tolerance traits – largely of commercial benefit to the suppliers and farmers. It has not yet provided more nutritious and less expensive foods. Consumers might, however, be persuaded if environmental benefits to the countryside could be clearly demonstrated.

If food security and nutrition are improved in countries with less certain food supplies the risk perceptions of GM technology adoption, giving greater stability and increasing production, will clearly be different. Such food security benefits might also help to better persuade the developed world.

More efforts to explain the new technologies and products, and even perhaps to involve consumer groups at an earlier pre-commercialisation stage to improve understanding and to engender more of a ‘public ownership’ feel might also help.

Some feel the ‘Biotechnology Industry’ should also be more robust – responding more frequently and powerfully to inaccurate and ill-founded criticisms in the media. Perhaps even to devote more time and money to pro-active explanation and improving public understanding. Persuading the public of the benefits of biotechnology through much greater support from GM companies to ‘honest brokers’, such as teachers and doctors, who can better explain the science could be worthwhile. Greater care also needs to be taken in the use of language, by GM companies and others, in explaining new technologies to the public to help to provide a better understanding of the science and potential benefits.

• Regulatory Authorities

A legacy of food crises and poor Government regulation in the UK has eroded public confidence in the regulatory process.

Creation of a new ‘Food Standard Agency’ with responsibility for food safety – separate from the Ministry of Agriculture, Fisheries and Food and Department of Health in the UK should help to improve public confidence.

The processes of regulation need to be completely transparent and based on good science. To earn the trust of the consumer, a rigorous assessment is required and full disclosure of all of the
scientific results and judgements. The nature of ‘transparency’ of regulation will, however, also need to be clarified.

Regulatory authorities need to acknowledge consumer concerns and fears and to apply a ‘precautionary principle’ to the process of investigation and judgement. The application of greater care to the regulation of GM product release would provide such ‘precautions’.

The consumer’s right not to trust the regulatory process must continue to be respected and if necessary defended. The process needs to be sensitive to public concerns – and should encourage more consumer participation.

More ‘public ownership’ needs to be cultivated in relation to new technology adoption, where clear benefits for society can be discerned. Frewer (1999) and colleagues believe that there is a public perception of ‘social exclusion from risk management processes’ in the UK.

- **Retailer Influences**

  Many consumers consider supermarket retailers, in the UK, to be the most reliable ‘gatekeepers’ for safe and quality food. Responsibility for unofficial regulation is, as a result, transferred to the marketplace. The need for supermarkets to retain and protect, consumer trust and to remain competitive encourages a precautionary approach.

- **Scientific Bodies**

  Disagreements between scientists on occasion; some poor science and a lack of commitment and enthusiasm from expert scientists to explain (and sometimes to defend) advances in biotechnology have not helped the GM debate in the UK. Not all good scientists made good public communicators – and some received a rough ride from the media at the height of GM controversies. Professional scientific bodies could play a much stronger ‘honest independent broker’ role in the face of inaccurate statements and scare mongering.

  Ironically, the UK has quite a strong science base – and better information and advice from scientists should have provided a more rational GM debate.

- **Media Responsibility**

  Insufficient understanding, extreme partisan headlines and poor science correspondence and some virulent anti-GM campaigns in the Press and media in the UK have created a hostile environment for GM development. Much of the coverage has been much more entertaining than informative – but the overall influence of the media has not been constructive in the UK.

**6.12 Which Way Forward?**

Advances in biotechnology can provide considerable benefits to society and probably will continue to do so in the next Century – on a par, if not more so, than electronics and information technology contributions in this century. We are already benefiting considerably from the application of biotechnology in health-care; the pharmaceutical industry and food processing – with much more to come. The adverse reactions to agricultural biotechnology and genetic foods, in Europe currently should not be allowed to stop appropriate developments. In this area, at the moment, consumers tend to feel that there are more risks than public benefits.

It is quite clear, however, that consumers must be consulted and involved. Without whom, of course, there will be no market for GM products. Everyone involved in the food chain needs to accept collective responsibility for new technology adoption – and to ensure that agricultural biotechnology, in particular, will continue to develop.
PART II – CASE STUDIES

7. Case Study Number 1

A Retailing Case Study - Royal Ahold Asia Pacific

This case study demonstrates the principles and practices behind a successful strategic alliance or supply chain and the benefits to all partners.

Rationale

There are a number of reasons for the development of a more appropriate and long-term arrangement for red meat to Asian consumers and more significantly Asian supermarkets.

1. The meat share of the total market was below the average for supermarkets at only 1.5% of store sales.
2. The wet markets in Asia had a disproportionate share in comparison to fruit and vegetables.
3. There were a distinct lack of skills in the Asian market and no recognised skill development courses.
4. The market is dominated by importers who mainly buy on price and protect the wet market.
5. Poor product handling and cold chain controls.
6. Inconsistent quality because of no pre-determined specification.
7. Supermarket prices are more expensive than at wet market.
8. Supermarkets are not really selling “Asian” style and cut.
9. No forward planning for marketing.

Initial Steps Taken

Royal Ahold Asia Pacific needed to deal with these problems and seek a partner that could provide some consistent quality product.

Four steps were initially taken to seek the most appropriate alliance partner.
1. Form an alliance with a meat supporter in Australia who is prepared to work together to develop a business and the market.
2. Royal Ahold selected South Burnett Meats as their partner.
3. They signed a supply agreement as “Preferred Supplier”.
4. Analysed the changes needed to make their goals achievable.

Managing The Change

Royal Ahold took the lead in this alliance and managed the transitory period. Royal Ahold took charge of the change. A six stage program was developed.

1. Assess the change.
2. Develop change leadership.
3. Build commitment.
4. Sustain new behaviours.
5. Configure the change program.
6. Manage the transition.
**Actions Undertaken**

Royal Ahold and South Burnett Meats then went about developing their alliance.

1. Royal Ahold and South Burnett Meats researched the Singaporean Beef market.
2. Royal Ahold and South Burnett Meats developed specifications for every cut to suit the market.
3. South Burnett Meat selects their suppliers to meet Royal Ahold specifications.
4. Royal Ahold and South Burnett Meats review the range of cuts used and then rationalised the range.
5. Jointly participate in the Australian Government’s Supermarket to Asia Delicatessen program to develop a project of selling Australian beef “Asian Style”.
6. Royal Ahold and South Burnett Meats then developed a business plan.
7. South Burnett Meats supplied skilled butchers to conduct training in Royal Ahold Singaporean stores.
8. Each of the parties injected funds along the Australian Government’s Supermarkets to Asia program to achieve the Business Plan and Supermarkets to Asia objectives.
9. Royal Ahold develops a Regional Trader Database and with South Burnett Meats commence E.D.I.
10. Royal Ahold and South Burnett Meats analyse the supply chain and jointly develop a more efficient and controlled supply chain and cold chain to supply products to Singapore supermarkets.

**Previous Supply Chain**

The original supply chain was seen as complicated, distorted prices and information and increased costs. The following supply chain outlines this.

![Supply Chain Diagram](image-url)
Alliance Supply Chain

An alternate supply chain was developed to try and compensate for the original complicated value chain. The following table illustrates the more simplified approach to product supply and distribution.

<table>
<thead>
<tr>
<th>South Burnett Meats Selected Suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerated Storage</td>
</tr>
<tr>
<td>South Burnett Meats</td>
</tr>
<tr>
<td>Refrigerated Transport</td>
</tr>
<tr>
<td>Refrigerated Storage</td>
</tr>
<tr>
<td>AEI Brisbane Singapore Airlines</td>
</tr>
<tr>
<td>Refrigerated Delivery</td>
</tr>
<tr>
<td>Refrigerated Storage</td>
</tr>
<tr>
<td>AEI Singapore Changi</td>
</tr>
<tr>
<td>Refrigerated Delivery</td>
</tr>
<tr>
<td>Ahold Distribution Centre</td>
</tr>
<tr>
<td>Refrigerated Delivery</td>
</tr>
<tr>
<td>TOPS Supermarkets</td>
</tr>
</tbody>
</table>

Ordering And Communication System

Royal Ahold and South Burnett Meats established their own ordering and communication system to ensure information is streamlined and management of orders are simplified across all business throughout Asia.
Result

As a result of these changes and the development of this new supply chain a number of advantages eventuated.

1. Greater consistency of product
2. New Asian style implemented
3. Supply chain savings exceeding 20%
4. Improved skills of personnel
5. Sales percentage share of store doubled to 3%.
8. Case Study Number 2

The Story of New Zealand’s Number 1 Brand “Watties” – A Manufacturers Response

History

Watties began in 1934 by a 32 year old accountant by the name of Jim Wattie. They started their first operation on the Heretaunga Plains in Hawkes Bay, New Zealand. Mr Wattie noticed whilst good fruit rolled on the ground, fruit pulp was being imported from Australia for the manufacture of jam. The opportunity was to substitute the imports of pulp.

At the time of this deep depression gripped the world. People lined up at soup kitchens and money was scarce. Jim Wattie’s company said “no” to the proposition.

He then went about raising funds through the local community. The capital of 50 shares at NZ$25 each was raised from 28 local Hastings men. This was achieved even though several food ventures in the same region failed.

At this time the New Zealand processed food industry was $500K of which jam and jelly constituted $200K.

The First Ten Years

The first ten years proved very successful and stamped the newly formed “Watties” as a Food Processor of significance. The following table illustrates this.

<table>
<thead>
<tr>
<th></th>
<th>1935</th>
<th>1944</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peas</td>
<td>-</td>
<td>132,078</td>
</tr>
<tr>
<td>Rations</td>
<td>-</td>
<td>107,673</td>
</tr>
<tr>
<td>Dried Peas</td>
<td>-</td>
<td>77,784</td>
</tr>
<tr>
<td>Carrots</td>
<td>-</td>
<td>60,503</td>
</tr>
<tr>
<td>Peaches/Pears</td>
<td>336</td>
<td>57,110</td>
</tr>
<tr>
<td>Beans</td>
<td>-</td>
<td>39,076</td>
</tr>
<tr>
<td>Tomato Soup</td>
<td>-</td>
<td>28,981</td>
</tr>
<tr>
<td>Pulp</td>
<td>5,428</td>
<td>870</td>
</tr>
<tr>
<td>Jam</td>
<td>31</td>
<td>19,852</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>65,040</td>
</tr>
<tr>
<td>Total</td>
<td>$5,795</td>
<td>$582,967</td>
</tr>
</tbody>
</table>

As you can see, significant diversification occurred and moved away from their original pulp products into fruit and vegetable products.

Today

By 1997 the Watties New Zealand business had grown significantly and reshaped their business into what we now have as their trademark products of baked beans, spaghettis and soup.
### Domestic Retail

<table>
<thead>
<tr>
<th>Category</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canned baked bens</td>
<td>118,051</td>
</tr>
<tr>
<td>Spaghetti, soup, sauce, baby food, jams, meats, canned fruit and vegetables</td>
<td>49,030</td>
</tr>
<tr>
<td>Pet food</td>
<td>61,686</td>
</tr>
<tr>
<td>Frozen vegetables</td>
<td>46,876</td>
</tr>
<tr>
<td>Ice cream</td>
<td>107,159</td>
</tr>
<tr>
<td>Chicken</td>
<td>135,929</td>
</tr>
<tr>
<td>Fresh</td>
<td>7,985</td>
</tr>
<tr>
<td></td>
<td>526,716</td>
</tr>
<tr>
<td>Other domestic sales</td>
<td>208,793</td>
</tr>
<tr>
<td>Export sales</td>
<td>148,383</td>
</tr>
<tr>
<td>Total Sales</td>
<td>883,892</td>
</tr>
</tbody>
</table>

The Wattie Brand was Number One in the Country

### Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Position in Market</th>
<th>Market Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baked beans</td>
<td>1</td>
<td>94</td>
</tr>
<tr>
<td>Spaghetti</td>
<td>1</td>
<td>92</td>
</tr>
<tr>
<td>Baby food</td>
<td>1</td>
<td>89</td>
</tr>
<tr>
<td>Soup</td>
<td>1</td>
<td>76</td>
</tr>
<tr>
<td>Tomato sauce</td>
<td>1</td>
<td>72</td>
</tr>
<tr>
<td>French fries</td>
<td>1</td>
<td>63</td>
</tr>
<tr>
<td>Frozen vegetables</td>
<td>1</td>
<td>62</td>
</tr>
<tr>
<td>Canned vegetables</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Fruit</td>
<td>1</td>
<td>47</td>
</tr>
<tr>
<td>Cat food</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Jams and marmalade</td>
<td>1</td>
<td>39</td>
</tr>
</tbody>
</table>

In all, Wattie represented 72% of all Supermarket sales.

### The Brand

Watties became known over this time as the “Power Brand” of the food industry and represented the man behind the brand. It also meant a number of other things including:

- Dedication to quality
- Pugnacious “can do” attitude
- Man of his people
- Unashamedly New Zealand company
- Logo was his signature

There were a number of threats along the way to the dominance of the Watties, more significant than Pet Food from Mars Australia.

The Watties brand, “Chef Jellimeat” a dual product for cats and dogs was the number one product in the grocery industry. When the Mars Pet Food branded products came to New Zealand, it had an immediate impact and took over as Number One product. The response from Watties were numerous and significant.

- They took the product off the market.
- Created 6 canned categories – premium, economy and price from cats and dogs.
- Reduced the can size to match Mars.
• Repackaged the product from cartons to shrink wrap trays.
• Line priced variants above competition. Today Watties remains Number One.

The next major threat from Australia was at Watties Baked Beans and Spaghetti. Before they knew it, this competitor had gained a 20% share of their traditional market. The response was swift:

• Repositioned Watties and Oak brands to defend their position.
• Oak high cost cheese recipe was rebranded Watties cheesy.
• New low cost recipe for Oak.
• Provided incentives to the trade and their representatives.

The Watties brand went to the Supermarket perimeter and achieved a number of things:

• It became the centre of the market.
• It bought quality chilled soup producer, “The Good Taste Company”.
• Extended the brand to chilled pasta sauces, purees, single serve and pasta itself.
• Number One brand in the category.

Whilst this was taking place, the retail market was getting stronger and stronger. They started to import their own product and own their own label. Their retailers began to establish a strong reputation for reliability and quality. They began to squeeze the marketing money from suppliers. This made Watties change from a marketing and sales focus to consumer and trade marketing.

With less money, Watties had to change their direction and became “Communication Smart”. They started Infomercials. These infomercials were put on immediately before the popular 6pm news and provided tremendous brand credibility for Watties. The book based on these infomercials became the biggest selling book in New Zealand.

Despite these refinements, the memorable line for New Zealanders was and is “It must be Watties.”

**Conclusion**

A number of lessons can be learnt from this experience.

1. Mature categories only occur because the participants have stopped playing.
2. It’s not your brand - it belongs to your constituents.
3. Protect your brand integrity.
4. Reputations are made and lost when things go wrong.
5. Adopt assertive strategies with leading brands.
6. Dual brand strategies can cover off a category.
7. Make sure your brand is prominent.
8. The brand is the company and the company is the brand.
9. Case Number 3

Producer Supply Chain Management Using Quality Management As The Key Instrument – Yarloop Piggery, Australia

Background

In September of 1994 a meeting was called by Agriculture Western Australia, of interested parties across all aspects of food production to discuss the concept of a Quality Management Code for the food industry. Amongst those in attendance were representatives of the farming community (livestock, fruit and grain), transport, abattoirs, processors, feed companies, veterinarians, pharmaceutical wholesalers, stock and station agents, public health and other related service industries.

It was recognised that all the process steps in the production of food had the ability to impact both positively and negatively on food safety and quality. The participants at that meeting demonstrated a genuine desire to participate in the implementation of a quality management system. However at that time there was not one system anywhere in the world that applied HACCP to the fundamentals of food safety and quality, packaged in a quality assurance code and had an audit system in place that would ensure both compliance and credibility to the end user.

From this beginning Agriculture Western Australia began developing the SQF 2000™ concept.

Yarloop Piggery Involvement

At a similar time, the Australian Pig Research and Development Corporation (PRDC) had committed funds to pilot programs on meat quality, meat hygiene and antibiotic residues. These were to be the forerunner for what was to become known as the Australian Pork Industry Quality Program (APIQ). Whilst the Australian Pork Industry had established a good record for food safety (and maintains so to this day) it was recognised that there was no room for complacency and these issues needed to be addressed.

Commencing in 1995 the Yarloop Piggery, participated in a pilot study program concentrating on antibiotic residues. The program participants totalled 27 pork producers across Australia. The aim was to implement a best practice for the correct diagnosis, use of the drug of choice, method and implementation of the treatment and to develop an accurate record keeping system. This would ensure that there would be no violation of minimum residue levels and it was felt that it would most likely result in a reduction in the use of routine medication treatments.

The Yarloop Piggery embraced the concept of this quality assurance program but realised that being able to document the products that were antibiotic residue free would do little to increase the consumption or acceptability of our product if it had the potential to be below standard in other areas of consumers’ expectations. Other aspects that had the potential to influence food safety and quality and that could adversely affect the end product were well documented so a commitment was made ensuring that an on farm quality management system that was best practice within the areas over which the participants had direct control or influence.

By this time (late 1995 early 1996) Agriculture Western Australia had developed the SQF 2000™ Quality Code and the Yarloop Piggery enthusiastically adopted this within their operation. What specifically attracted them to the SQF 2000™ code was that it was a HACCP system and incorporated elements of the ISO 9000 code that applied to the production of food. It also had a requirement of a third party audit by internationally accredited auditors and it was directly applicable to both farmers and producers of food.
Steps to Implementation:

- Examination of what the participants wanted to produce and formalised their commitment in a quality policy statement that defined their intent.
- Charted an organisational structure clearly defining each person’s roles and areas of responsibilities.

These two initiatives formed part of a valuable base from which to implement a Quality Assurance System as it served to remind all personnel what the objectives were and who is responsible. It clearly shows a team effort is required and a total commitment from all parties is essential. As part of our experience very early on in the implementation phase, this identified a member who was not committed to the system and they where replaced.

- The Yarloop Piggery examined their training methods on farm and ensured that all personnel were trained in the necessary procedures and took steps to ensure that best practice was maintained at all times. Where necessary staff were trained or updated on some procedures.
- They examined all purchasing requirements including the purchase of feed, breeding stock and other raw materials.
- They requested their veterinarian to supply and maintain a written authorisation as to what medications could and could not be used on the farm.

All companies supplying product to the piggery operations were supplied with a written set of specifications that clearly defined their requirements. This included the feed company, breeding stock supplier and veterinary wholesalers. Only those medication duly prescribed could be purchased and used. Any supplies of any source that did not meet specifications were to be rejected outright and the supplier either cautioned or replaced depending upon the circumstances.

- A HACCP team was put in place and a HACCP audit table drawn up to plan and control the production of pig meat from our operation.
- This involved both the Main Steps and the Process Steps for each stage of our production being identified and Hazards within those process steps were identified as either critical control points or control points.
- In the beginning this focused on them being hazards of a microbiological, physical or chemical nature.

Every hazard had to be addressed.

In order to have control over as much as possible in the production system they decided upon a scope of, “Starts with the purchase of healthy breeding stock and finished with the loading of healthy pigs grown and produced free of violative levels of antibiotic residues and handled to customer specifications onto transport for delivery to abattoir.”

1. All Control Points (CP’s) and Critical Control Points (CCP’s) were identified.
2. Preventative measures outlined.
3. Responsibility assigned to a person or position.
4. A monitoring regime devised.
5. Frequency of preventative measure defined.
6. Critical limits established.
7. Corrective actions defined.

HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying upon end product testing. It is dynamic, accommodating to change and should be reviewed on an on going basis with the change in technology, equipment design and where on site experience has demonstrated the need for review. It is the engine room of a quality system.
• Where necessary operating procedures were written specifically or drawn from existing documentation to ensure the correct protocols were followed.

• A finished product specification was defined. These specifications were determined by both the desire to produce a wholesome, safe, quality product but also to consumers’ expectations.

• As soon as practical following the identification of any fault or deviation in the quality system or in its application that may compromise product safety or quality, a Corrective Action procedure was implemented.

This enables the personnel to document a situation should it arise for record keeping and audit purposes and to also examine the cause and to revisit HACCP to place a control point to ensure that it is not repeated.

• Most importantly a presale procedure was outlined to ensure that all stock sold were within the scope and specifications of the quality policy and most importantly were consistently within the consumers’ expectations.

This clearly indicates that all the process steps such as medication records, feed and water regimes, stock movement and handling, sale selection and transport amongst others were adhered to. Finally, a consignment note was completed and forwarded with the pigs.

• In order to maintain accuracy of the inspection, measuring and test equipment a procedure was outlined to ensure accuracy was assessed and maintained.

As new items of equipment are purchased or replaced they are not automatically assumed to be accurate in either the weights they measure or the volume they administer. This is of vital importance in such cases as the administration of medications or the fine weighing of feed ingredients. This area has been of significant importance and in some instances have found that some automatic dose apparatus have not met specifications.

• Internal audits have been designed to ensure that procedures are carried out and that personnel do not “simply tick the box” out of habit.

This is best carried out by a person who, whilst familiar with the type of operation is not one of the day-to-day personnel. Their consultant veterinarian completes this audit twice per year.

• Document control and quality records are maintained meticulously and are retained on farm for examination by the third party auditor for a period of 12 months.

All procedures are documented including the obvious such as medication records and feed ordering/delivery records. All other procedures are documented including the routine neo natal care protocols as whilst they may not appear to impact directly on food safety or quality they can still influence the overall health and well being of the animal.

• Product identification and traceability issues are clearly addressed on our sale records which include the date of sale, consignee, live weight, age and tattoo brand on the animal along with the time of feed and other information that may be relevant at the time.

**Operational**

Initially this was not an easy task mainly because no one had applied HACCP to a living animal in considering them as food and consequently they were writing and implementing a system from the very beginning with no examples to use as guidelines. Indeed critics state that the principals of HACCP could not be applied to livestock, as they were not food. The connotations of food were that an animal was to be slaughtered before it could be considered food.
• The hardest part from a producer’s perspective was grasping the concepts of HACCP, applying it to a live animal and ensuring that no Process Steps in the production were left out.

• Whist they had always run their operation along fairly strict guidelines with what was probably an above industry average of existing written records, a number of records still needed to be created. These were designed around the check list, prompt concept that has worked very well.

• A number of Quality Procedures were written to replace the memory and verbal procedures that had served well in the past.

• During the first 6 months of 1996 they worked within their quality system fine tuning it and altering the areas we identified as either an over emphasis or a potential risk not addressed.

• By July of 1996 SGS International Certification Services Pty Ltd completed their desk audit and followed with a certification audit a week later.

July 24th of 1996 they successfully completed their first Certification Audit to SQF2000SM. At that time they were the first piggery or livestock enterprise in Australia (or elsewhere) to do so.

For the next 3 years they were subject to surveillance audits every 6 months, their quality system ran smoothly but with constant reviewing and fine tuning especially in the first 12 months. After the period they became more relaxed with the system, confident that they had addressed the major issues and very confident that they had a system in place that was achieving their stated aims and objectives.

**Add Ons and Improvements to The System**

Quality is about producing to consumers’ expectations and as a consequence producers need to be very aware of changing consumer opinions and requirements. Issues such as animal welfare, the “clean green” image, eating qualities (pale soft and exudative, dark firm and dry, boar taint, genetics affecting intra muscular fat) are examples of issues that can affect both the safety and quality of our product.

The Yarloop Piggery are in the closing stages of a recent herd expansion and in line with this consumer trend on perceived welfare issues. The proprietors have taken the opportunity to incorporate some alternative straw-based livestock housing. Whilst the conventional housing has served both them and the animals very well over the years, consumers in some potential niche markets may consider some of these housing styles to be unsatisfactory. There is certainly an improvement in air quality in these straw-based systems and the animals themselves clearly enjoy the increased space.

In line with industry standards and consumers’ expectations they have continued to update their HACCP to include all factors that within the Pork Industry that can affect food safety and quality.

As mentioned earlier the Australian PRDC had supported pilot projects on issues affecting meat quality and safety within the industry and as a consequence of the knowledge and experience gained from these the APIQ program was launched. The program addresses Physical Hazards, Meat Quality, Chemical Residues, Biological Hazards and Welfare.

Briefly, the program set levels for producers to commit themselves to an on farm quality assurance program.

1. **STAGE ONE**
   - Adopt the APIQ standards
   - Sign a Statutory Declaration signifying acceptance of these standards.

2. **STAGE TWO**
   - Complete stage one
   - Develop skills in HACCP and Implement a documented HACCP plan and have it independently audited.
   - Complete a compliance audit.

3. **STAGE THREE**
   - Complete stages one and two of the program.
   - Implement and operate a quality assurance system meeting the requirements of ISO 9002 or SQF 2000.
   - Complete a third party audit.
To this date (September 1999) over 1,000 Australian Pork Producers have signed onto the APIQ program and a number of the major processors in Australia have made it mandatory for their producers to have completed stage two by December 31st this year (1999). Non compliance of this requirement by those producers will mean they will no longer be able to supply to that processor. It is my expectation that this uptake of the APIQ program will continue to accelerate.

The fact that such a significant number of Australian pork producers have adopted the APIQ program and the fact that the APIQ program has made SQF 2000CM certification a requirement for level three has clearly endorsed the SQF 2000CM code and raised its profile considerably.

Conclusion

- In December of 1998 the piggery was registered with the APIQ secretariat to Level Three.
- In July of 1999 they were subject to their first re certification audit for SQF 2000CM some three years from the beginning. We were successful in this and will now be subject to annual audits rather than the previous 6 monthly.
- An added benefit of their quality manual was that starting new employees were encouraged to familiarise themselves with the quality system prior to starting in the position. This benefits both to them and the business right from the outset.
- Other industries have appeared surprised that a livestock operation has been quality assured and in doing has helped raise the profile of the industry significantly amongst certain business partners.
- The audits are very thorough, the auditors competent and diligent and there should not be any attempt by any parties to either falsify or fail to maintain their quality system.
- A third party audit is absolutely essential for the integrity and credibility of any Quality Assured operation.
10. Case Study Number 4

Singapore and the Role of Supply Chain Management in their Future Focus

This section will detail the current trends in the supply chain for fresh food in Singapore and the forces driving a more cooperative approach to the food industry.

Introduction

Trends in the supply and distribution for fresh produce are being influenced by a multitude of factors. A good understanding of the underlying forces driving the trend helps in recognising and providing a better forecast for the food and agriculture business in Singapore.

Limited Land Resources

Singapore is a city-state, a metropolis with limited land resources. Therefore, Singapore does not produce much food and is dependent on imports for most of its food supply. At present, local farms produced only 2% of fish (8% if catches by local fishing vessels are included), 4% of vegetables and 32% of eggs consumed in Singapore. A total of 1,700 hectares of land have been set aside for the development of agro-technology parks for agriculture and food production purposes utilising modern farming techniques. Competition for land is very keen and there will be no let up on this.

Singapore was self sufficient in pork, poultry and eggs in the 1980’s, when pig and poultry were doing well. However, Singapore imports virtually all its meat and fruits, well over 90% of fish and vegetables and 68% of hen’s eggs.

Free Market Economy

Singapore maintains a free market economy. Fish produce that meet Singapore’s bio-security and food safety requirements can be imported without any quota or tariff. In 1998, Singapore imported 44 million chickens, 7.5 million ducks, 1.3 million pigs, 8000 sheep and 200 cattle for slaughter in local abattoirs. In addition, Singapore also imported 380,000 tonnes of fruits, 360,000 tonne of vegetables, 250,000 tonne of fish and fishery products, 66,000 tonne of poultry meat, 16,000 tonne of beef, 10,000 tonne of lamb, 8000 tonne of pork and 720 million pieces of chicken hen eggs.

Diversification of Supply

For Singapore, It is good policy and practice to have as diverse as possible the sources of supply for fresh produce. This reduces their dependence on any particular country for their food supply. Their approach is to review the production systems and health status of the exporting countries and accredit as many systems as possible those that meet Singapore’s requirements to be on their list of approved countries or establishments to supply livestock, meat, poultry and eggs to Singapore. They will not, however, interfere with the market force of an open economy to curtail or favour any sources to supply fresh produce.

Consumption

Singaporeans love food. They believe in ‘live to eat’ and not ‘eat to live’. When it comes to food, Singapore consumers are well off despite limited local production.

In 1998, the per capita consumption in Singapore was 64.1 kg of meat, 25.6 kg of fish, 77.0 kg of vegetables, 81.6 kg of fruits and 275.6 eggs. The standard of living in Singapore is based on food consumption and is comparable to that of other developed countries.
There has been an overall increase of about 10% in per capita consumption over a 20-year period from 1978 but an 8% decline over a 10-year period from 1988. Over the last 10 years, there has been a drop of 11% in meat consumption, 37% in fish and 14% in fruits but an increase of 10% consumption in both vegetables and eggs.

The consumption data in 1998 is complicated by the sharp rise of skilled immigrants swelling the mid-year population by 27% in 2 years from 3.04 million in 1996 to 3.87 million in 1998. This has substantially depressed the official per capita consumption levels. However, the trend is towards a decline in fish consumption and a gradual increase in egg, fruit and vegetables. Meat consumption appears to be fairly stable.

But in absolute terms, the demand for the supply of fresh produce has increased across the board due to a substantial overall increase in the population. They are reaching the target 4 million population soon and the population growth rate will be stabilised at the steady state of around 1.9%.

Demography

Singapore is made up of 3 main ethnic groups, the Chinese (77%), Malays (14%) and Indians (7%). This racial mix remains relatively stable throughout the years. The religious beliefs of the various ethnic groups have a strong influence on the types of meat consumed in Singapore. All races and religious groups consume chicken. It is the highest per capita consumption of 32 Kg. Pork rank 2nd at 23 kg per person per year as pork is the main meat item for the Chinese which constitute more than 75% of the population. Large proportions of Indians are Hindus and they do not eat beef. Malays are Muslims and they do not eat pork and duck. Per capita consumption of beef, lamb and duck are 3.0 kg, 2.5 kg and 2.9 kg respectively.

Consumer Preference

- **Wet markets**

Fresh produce is retailed mainly through wet markets. Wet market is a way of life in Singapore. Consumer preference for warm meat has resulted in the retailing of such meat largely through wet market stalls. Today, there are 2423 stalls selling meat in some 110 wet markets. They play a leading role in the business of the wet markets. In the recent Nipah virus crisis in Malaysia, no warm pork was available in the wet markets, other fresh produce stalls were affected as well as consumers cut down their visits to the wet markets.

- **Supermarkets**

However, the younger generations of consumers are shopping more and more in supermarkets and in air-conditioned comfort. Today, there are 4 major chains of supermarkets with a few smaller groups providing a total of 145 outlets. The leader of the chains, the NTUC supermarkets has increased its number of outlets by 46% in 15 years from 45 in 1985 to 66 today. An increasing volume of fresh produce is being sold through supermarkets and this trend will continue.

Health Scares

In the last few years, there have been a number of scares around the world, some of which have dramatic and long lasting impact on the consumption and supply of certain types of food.

- **Mad Cow Disease**

In 1996, the Health secretary announced in the House of Commons in London that BSE (Bovine Spongiform Encephalopathy), the Mad Cow Disease in cattle would be linked to the human CJD, an incurable degenerative neurological disease in man. Infected beef was incriminated. The demand for
beef plummeted worldwide. Despite the fact that PPD imposed an immediate ban in British beef and required all exporting countries to be free from BSE for 6 years before they could export beef and beef products to Singapore, consumers just stayed away from beef. Per capita consumption dropped from 4.9 kgs in 1995 to 3.5 kgs in 1996 and the beef market has yet to recover from the blow. The per capita consumption in 1998 was 3.0 kg.

- **Bird Flu in Hong Kong**

Avian Flu in Hong Kong broke out in 1997, 17 people were taken ill seriously and 5 succumbed to the infection. This was the first time that such bird flu had jumped from bird to man. People in HK and Southern China did not want to eat chicken. But this does not have a lasting impact as the disease can only be contracted by close, direct contact with the sick birds and not through consumption of chicken meat. Although some consumers in Singapore were wary about eating chicken then, poultry meat consumption for 1997 was not really affected with 37.4 kg per capita in 1997 versus 38.6 kg in 1996.

- **Viral Encephalitis in Malaysia**

In March 1999, a brand new virus, the Nipah virus, caused large-scale outbreak of encephalitis in pigs and man, resulting in more than 100 human fatalities in Malaysia. The zoonotic viral encephalitis spilled over to Singapore through the import of pigs for slaughter. 11 abattoir workers came down with respiratory and some with encephalitic illnesses with 1 death.

The impact of this new death on the supply of pork in Singapore is tremendous and long lasting. Singapore banned the import of pigs and all mammals from Malaysia and closed the 2 abattoirs for disinfection. No warm pork was available and consumers were totally averse to eating pork although the disease was shown to be contracted only through close, direct contact with pigs. Consumer confidence was totally eroded but is slowly coming back. Pork consumption has returned to 80% of the pre-Nipah level but warm pork is replaced by chilled and frozen pork.

**Market Force and Price of Meat**

The wholesale and retail prices of meat is determined by the supply and demand situation. The retail prices have also a strong influence on the buying pattern of the consumer. Chicken is the most popular meat item in Singapore as it is the cheapest meat available. Consumers tend to use chicken to substitute other meat whenever their prices go up.

At the peak of the Nipah crisis, chicken was used to substitute pork in many food preparations. Import of frozen chicken doubled from the usual monthly 4,450 tonnes to over 8,000 tonnes in April and June and a peak of 9,584 tonnes in May 1999. However, with increasing import of chilled and frozen pork, the demand for chicken has come down and returned to virtually the usual level by this month.

**Government Policy Decisions**

- **Centralised Poultry Slaughter**

Before early 90’s, poultry were slaughtered mainly at the wet market poultry stalls for direct sale to customers. They also supplied dressed poultry to caterers and cooked food stalls. Singapore’s requirements for poultry were 100,000-120,000 chickens and 20-25,000 ducks daily. In 1990, Government decided to phase out slaughter of poultry in such places and to have the slaughter of poultry done in modern poultry abattoirs. This was because slaughter of poultry in wet markets caused serious water pollution and gave rise to public nuisance, smell and noise. In addition, public health concerns over meat safety in particular with regards to microbial contamination and chemical residue was the other reason.

Centralisation of poultry slaughter at service abattoirs will allow systematic inspection and monitoring for food safety to be carried out. 506 stalls in 103 markets were phased out in 7 batches of 11-18 markets over 2 years. In their place, 17 poultry abattoirs (4 duck and 13 chicken) were set up. Since
1992, all imported birds have been consigned directly to the poultry plants for slaughter. Fresh chilled poultry are now available at wet market stalls, supermarkets and minimarts.

- **Cold Chain**

Up to early this year, about 90% of pork were sold warm through the wet markets. To feed the warm meat system, pigs were imported from accredited farms in neighbouring Malaysia and Indonesia (Bulan Island) for slaughter. Local abattoirs operated at night to produce fresh pork in time for the morning marketing hours in the wet markets. This system was unsatisfactory for many reasons. Pork sides were delivered in the wee hours of the morning to unattended wet market stalls. They were exposed to rodents and other vermin until the butchers turned up at their stalls to get ready for business. Warm carcasses exacerbated a common defect in meat quality – the PSE (Pale, Soft, and Exudative) condition in pork. Meat also spoils rapidly under warm and humid conditions of the Tropical Singapore particularly so in the wet markets.

The Government has planned to introduce a complete cold chain for the wholesale and retail distribution of meat and has been working with the industry for some time to address the problems. The Nipah virus outbreak in Malaysia provided a window of opportunity to bring the cold chain about quickly. Import of pigs was stopped on March, 1999 and no warm pork was available. Chilled pork was flown in from approved establishments in Australia and sold through supermarkets.

Since the resumption of import of pigs from the sole accredited farm in Indonesia’s Bulan Island, local abattoirs have been given permission to produce only chilled pork. Pork sides are chilled to 4% or below before transported in refrigerated trucks to meat cutting plants for jointing into primal cuts or de-boning. Primal cuts and de-boning joints are also delivered in refrigerated trucks to retail outlets. Wet market stallholders were given till 1 November 1999 to install appropriate display chillers to continue selling pork.

Sales of chilled pork through supermarkets and minimarts have increased substantially while wet market stalls have lost quite a bit of business. The wet market stalls are likely to be reduced by 15-20% through attrition. The trend of buying chilled meat will still handle substantial amount of chilled pork when their display chillers are in place.

Poultry stalls are given till 1 May 2000 and beef and mutton stalls have until 1 November 2000 to have their display chillers installed to continue their business.

At present, the new abattoir in Jurong is killing 800 pigs daily producing 52 ton of pork. This appears to be the steady state of the production. Import of chilled pork has gone up to 87 ton and frozen pork to 78 to daily this month. Pork consumption in Singapore has returned to 80% of the usual level. Import of frozen pork has gone up by 3.5 times while import of chilled pork has jumped 860 times over the previous year. Today, chilled pork accounts for 64% of the supply while frozen pork takes the remaining 36%.

Meat processing and food catering outlets have turned to frozen pork while retail consumers prefer chilled pork. This trend will continue unless the industry comes up with a good presentation and marketing strategy to attract consumers to buy frozen pork.

Conversion to complete cold chain in the meat industry opens up an avenue for expansion and enhancement of reefer facilities in Singapore. This includes cold stores, reefer vehicles and display chillers. Even in the airfreight of chilled pork, Australia will introduce the use of skyboxes and chilltainers to supplement the standard AV containers.
Developments in the Industry

• Fruits and Vegetables

170 types of vegetables from 39 countries and 87 types of fresh fruits from 46 countries were imported in 1998. They come in by land, sea or air. The bulk is unloaded at Pasir Panjang Wholesale Centre for distribution. Imported fruits and vegetables are sole through auction or private arrangement to retailers or distributors who in turn supply the produce to similar retailers.

Vegetables from 71 local farms are harvested in late afternoon. They are trimmed, sorted, washed and packed in returnable plastic container for delivery to wholesalers. A few farms pack their produce in consumer packs for direct supply to supermarkets.

There is an increasing tendency for supermarkets and even restaurants to import or buy directly from growers or exporters. Demand for retail ready packs is on the rise.

Malaysia, being our nearest neighbour, is the major supplier of leafy vegetables. Leafy vegetables are bulk packed in a variety of containers such as bamboo baskets, recycled cartons, nylon sacks and more recently HDPE returnable containers and Styrofoam boxes. Cameron Highland growers tend to over-stuff the baskets resulting in damage and spoilage in the produce. Almost all fruit and vegetables from Malaysia are transported in open trucks under ambient temperature. Recently, a few importers have started to use reefer trucks to transport their vegetables. There is also an increasing use of HDPE returnable containers.

Imports from other countries arrive in reefer containers. Temperate fruit and vegetables from Australia, USA and Europe are usually graded and neatly packed in cartons or Styrofoam boxes with proper labelling, brand names and bar-codes.

There will be an increasing use of returnable containers and reefer containers in the distribution of fruit and vegetables.

• Fish and Seafood

More than 90% of fish available in Singapore are imported. However, the quantity of imported fish has dropped by 16% in 12 years from 110,000 tonnes in 1986 to 92,000 tonnes in 1998. Indonesia is the major supplier of fish to Singapore accounting for about 40% of imported fish over the last 10 years. The Asian economic crisis has prompted a significant increase in the Indonesian vessels calling at Singapore to land their fish for higher cash return. This has resulted in Indonesia supplying 50% of imported fish in 1998. Malaysia and Thailand are the top 2 suppliers.

Foreign fishing vessels land their catch in Jurong Fishing Port while Singapore’s local fishing fleet dock at Senoko Fishing Port. Reefer trucks from Thailand and open trucks from Malaysia also send their fish to Jurong Fishing Port. Fish is auctioned in the early hours of the morning at the wholesale markets to retailers in the 2 fishing ports. The fish is usually packed in ice. Wooden crates were widely used a few years back. However, these have been replaced by insulated plastic containers that are more hygienic and can be cleaned properly and reused. Over 95% of the bulk containers used today are such plastic crates. The remaining 5% comprise Styrofoam boxes for air-flown fish and a few wooden boxes for live crabs.

Currently, the bulk of the fish available are wild caught from the sea. There seems to a dwindling supply of fish from the usual fishing grounds of both our local and foreign vessels. Singapore encourages the industry to go for large-scale deep-sea aquaculture in waters around the Riau Islands, Indonesia. It is estimated that 40% of our fish supply can come from such production. A thriving live fish trade could be in the offing.
PART III – CONCLUSIONS

11. Factors and Principles Determining Success in Partnerships and Alliances

Do partnerships and alliances improve production and marketing efficiency? The case studies suggest they often do. A business supplying major retail customers using open markets and imports gave way to a supply and production system that was geared to quality and consistency. In the Royal Ahold case the market became more efficient in a technical sense as well as a customer sense mainly since the level of value added rose to match the enhanced characteristics of the customer.

Partnerships are most prevalent in growing markets, where consumers wants are fragmenting and there is scope for increasing sales of value added products, to the benefit of consumers. In the Royal Ahold case, consumers are offered a wider choice of products, particularly at the higher added value end of the market. The retailer distributor alliance comes in the form of lower costs, more efficiency in retailing – responding to consumers faster.

There is probably no better summary of the keys to the successful development of a supply chain in the food and agribusiness sector than in the book Breaking With Tradition - “Twenty Major Factors that Influence the Successful Establishment of a Partnership and Alliance

1. Clear benefits for all partnership and alliance members.
2. Business proposition underpinning the partnership or alliance that makes long-term commercial sense.
3. Focus on specific partnerships, products and markets.
4. Build upon successful partnerships and alliances.
5. Apply lessons learnt from the partnership/alliance to gain benefits in other business areas for each partner.
6. Partners/alliance members should have a good strategic fit.
7. The commercial relationship should be based on interdependence.
8. Companies with similar corporate values and the same commercial ethos make good partners.
9. Mutual trust and respect.
10. Aim high – make it difficult for others to follow.
11. For junior partners: pick a senior partner with a long-term commercial future.
12. Build relationships and communication links between all levels.
13. Gain full endorsement of the venture by the most senior management and strong personal commitment of all staff.
14. Members should hold a common view on the long-term objectives of the partnership or alliance.
15. Partnership/alliance members should hold a common view of what the final consumer wants.
16. Raise the veil of secrecy and focus on sharing information required to make the partnership/alliance a success.
17. Investment in physical plant and, for horizontal alliances, joint investment by alliance members builds commitment to the venture.
18. Build flexible organizations that meet the specific needs of each partnerships or alliance.
19. Fix problems as they arise – delays only serve to disrupt.
20. To ensure success, partnerships and alliances require their fair share of commercial good fortune.”
12. Implications for Participants in the Supply Chain

12.1 The Retailer Focus

From all the previous discussions in this document the conclusion is that retail markets will concentrate even further and try to take greater control over the supply chain. With the major retailers being Euro-centric, a region with minimal growth prospects, two implications will almost surely result. A greater focus of these retailers into the faster growing Asian market and an emphasis on obtaining more cost savings from the supply chain. The implication is that there will be increasing pressure to establish long term relationships with suppliers, whether they be distributors, producers, processors or manufacturers. They will in turn seek to secure supply agreements with the raw material suppliers.

12.2 The Manufacturer Focus

As a result of the rationalisation of retailers there will no doubt be further concentration in the manufacturing sector. As this concentration continues greater opportunities will no doubt arise for specialised boutique food products. Processors will also form closer ties with suppliers to secure raw materials and to ensure they can provide product to their retail customers.

12.3 The Producer Focus

The good news for producers is that, for the well organised, market orientated and of adequate size to supply the level of volume required by the major buyers, there are significant opportunities to become the preferred raw material supplier for the manufacturers, retailers and food service companies.

Unfortunately for Australian farmers we do not often fall into that category. In general, the impression is there is a widespread inability to meet buyers needs in terms of price, presentation, marketing support and volume of supply. There is a tendency for farmers to see themselves as working in isolation and often display an “us against them” attitude towards others in the supply chain, in particular the retailers.

Clearly, the implication of consolidation in the retail and manufacturing sectors to the farmer, with the growing importance of alliances and partnerships, is that the individual farm businesses must position themselves so that they can access a marketing group that has the clout or preferred supplier status. Other vital elements include:

- An integrated system linking production with point of sale allowing information flow up and down the supply chain.
- Product that is of the highest quality and meets all the regulatory and consumer requirements.
- Consistency of supply.
- Suppliers with the initiative and capacity to develop new products.
- Suppliers that can work with buyers to provide price stability.
- A marketing perspective of the supply chain rather than a production view.
- A preference for long term commercial relationships.
13. Final Say

So, in the face of this retail/manufacturing concentration, what can a food and agribusiness organisation do? They can:

- Innovate
- Cost Leadership.
- Geographic Diversification.
- Identify new consumer needs and new usages.
- Diversify into sectors within the existing geographical market.
- Explore new distribution channels.
- Invest in your brands.
- Attack and demolish competitor brands.
- Produce own label for major retailers.
- Simplify the overall merchandising approach to maximise value to customers.
- Target markets where you can be No.1.
- Make your brands based on proprietary technology.
- Gain exclusive access to raw materials.
- Develop alliances with long term winning retailers.
14. References


