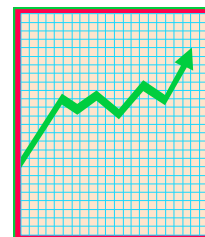


21. Trends that impact New Zealand's horticultural food exports

In this case study we cite nine important trends that scientists, producers and exporters must consider if New Zealand is to maintain its very successful level of fruit and vegetable exports.



1. **Consumer Power:** increasingly consumer power will influence products and services provided by supermarkets worldwide. Product range will become more complex and fragmented as producers, manufacturers, marketers and supermarkets strive to meet the needs and demands of increasingly sophisticated consumers. Failure to recognise this will lead to commercial failure.¹
2. **Convenience Rules:** to a large degree snacks and meals have become interchangeable and where 'convenience food' is associated with eating while moving and also quick home cooking. Increasingly there are concerns that convenience foods should also be healthier. Real household incomes are growing and the percentage of income spent on eating food away from home is increasing and this trend will be especially important in many developing countries over the next decade as a growing middle class population emerges.
3. **Increasing Customisation of Food:** the need for 'customisation' comes from people increasingly expecting to be use food to suit time, energy and health or leisure needs. Ethnic and cultural changes will impact on food availability and choice as will changing demographics related to population ageing. Customisation is driving the development innovations such as indicator labels for shelf-life and product composition as consumer requirements become increasingly dynamic. Status and pleasure create demand for new flavours and tastes and indulgence food will be sought after.
4. **Health and Wellbeing as Drivers of Food Consumption:** there is increasing demand for food and food products that enhance human health, wellness and body shape on a global scale as public health legislation shifts to the individual taking more health responsibility and health foods considered the most important instrument. Fresh fruit have been relatively "under-consumed" compared with snack foods. . Food safety issues will become even important in purchase decisions. Consumers are likely to demand more 'natural' foods, take alternative medicines, and demand functional foods with specific health providing ingredients.

The trends towards health-related products, convenience products and value-added products represent a significant growth potential for new and novel fruit varieties meeting these demands.

5. **Environmental Sustainability:** Current horticulture programmes are combining economic performance criteria such as the yield or gross margin and quality-based research (is it safe to eat?) with sustainability research (how the product is produced), which by its very nature involves economic, environmental and social aspects in an inter-related whole.

In agriculture new micro diagnostic kits will give growers the ability to monitor plant health status at the cellular level, in the same way that they now use meteorological data and gross measures of pathogen load, for plant health management.

Semi-closed systems, low chemical usage, IPM, etc are occurring, but the major trend is perhaps more in the organics pathway than organics itself and may be a greater trend than organics alone. The issue of 'food miles', nationally and internationally, will become more important in export market as environmental and resource issues surrounding food production, packaging, storage and transport are targeted by special interest groups.

¹ 'The Global Consumer in 2014': David Hughes, Prof. of Agribusiness and Food Marketing at Imperial College, London – courtesy of NZTE, 2005

6. **Food safety:** consumers want to know that their food is safe, and proof of claims is becoming a key requirement, especially in the health benefit area. Certification and tracking of food production for safety reasons is increasing. There is a growing desire for "safe" and "natural" foods. Growth in the organic food sector is a consequence of this desire. Traceability techniques using state of the art, virtual real time monitoring will become the norm for horticultural food crops.
7. **Increasing Competition:** traditional international trade barriers are being lowered, resulting in an increasing amount of international global competition. A major consequence may be the necessity for reducing costs as a way of staying competitive. However fewer major supermarket chains will dominate sales globally, gaining increased power over producers, and marketing under their own brands to high quality standards.
8. **BioDigital:** the exponential increase in the power of IT combined with new technologies is fast creating a world where the monitoring and management of biological systems is available for real-time decision making. The reducing cost and increasing power of computer-based analysis will make current new technologies the preferred tool of regulation and monitoring internationally.
9. **Convergence of Sectors:** convergence of food, health and biotech areas is resulting in new products (value-added) and companies moving into new areas such as functional or fortified foods/ nutraceuticals; vaccines through food products, and where plants and microbes are starting to be used as factories in the production of biomaterials, plastics, fuels etc in plants (plants as factories).

Trends that impact New Zealand's Horticultural Foods

1. Consumer Power

Increasingly consumer power will influence products and services provided by supermarkets worldwide. Product range will become more complex and fragmented as producers, manufacturers, marketers and supermarkets strive to meet the needs and demands of increasingly sophisticated consumers. Failure to recognise this will lead to commercial failure.²

Consumer Power is demonstrated by the increasing demands for more knowledge about where a product comes from, how it was grown, and what its health and nutritional properties are. Negative consumer power can arise in the form of consumer boycotts against sellers and producers who do not meet the expectations of consumer groups. See also #4 *Sustainable Horticulture Systems: Consumers, Society, etc., Market and Consumer Pressure*, and #5 *Food Safety*.

2. Convenience rules

Snack and meal solution manufacturers are faced with the opportunity to completely redefine the diet. To a large degree snacks and meals have become interchangeable³. Nine food and beverage categories grew 10 percent or more globally (2002): drivers were convenience, health and novelty. Evening meals become snacks and a part of leisure where chores are avoided and food is associated with relaxation, indulgence, informality, comfort and fun. Lunch and breakfast markets are expected to have the biggest growth with convenience as the key. Convenience is associated with: eat 'on the run'; quick home cooking; products that don't drip or stick; can eat in one hand. Increasingly there are concerns that convenience foods should also be healthier.

In Asia, there is predicted growth in convenience foods due to traffic problems, population growth, women working, and increased income leading to the emergence of a sophisticated middle class. Alongside this trend is an increase in cafes, trendy foods, sophistication, twenty-four hour sales, snacking, sweet and gourmet and health foods.

3. Increasing Customisation of Food

Customisation of products, including food, is driven by a globalisation of business⁴. People increasingly expect to be able to mix and match to suit mood, needs for time, and to use food to meet energy, health or leisure needs; one rule for all no longer applies. In short, consumer requirements are increasingly dynamic.

Manufacturers and suppliers are diversifying the customer base and tailoring services. Boundaries are blurring between food categories. There are increasing numbers of ingredients or processes that apply across foods, personal care and cleaning systems - and this applies to enzymes, proteins and compounds. Customisation needs are driving the development of indicator labels and systems for shelf-life, for product composition, and the presence of toxins and allergens.

² *The Global Consumer in 2014'*: David Hughes, Prof. of Agribusiness and Food Marketing at Imperial College, London – courtesy of NZTE, 2005

³ "Convenience Before Health" Food Navigator, February 2003

⁴ *Futurist 2001: Trends Now Changing World*

4. Health and Wellbeing as drivers of Food Consumption

Concern for one's health has become a strong driver of food consumption in the markets of moderate- and high-income consumers. Health costs are causing a mini-boom in preventative medicine: increasingly important is obesity, Alzheimers, arthritis, back pain, diabetes, heart disease, and gut disease. Taking care of one's health may be rewarded by reduced insurance premiums; personal wellness can be achieved through a combination of diet, exercise, and lifestyle e.g. obesity has the same predicted risks as smoking in terms of life longevity.

Public health legislation in some countries is shifting to the individual taking more health responsibility, with health foods considered the most important instrument⁵.

There is an expectation that an increased choice of foods will be available. Restaurant meals with nutritional information, suitability for genetic types, and taste definitions will become normal and people will customise their meal choice to suit needs/desires.

New Varieties

There is increasing demand for food and food products that enhance human health and wellness on a global scale. Fresh fruit have been relatively "under-consumed" compared with snack foods. The trends towards health-related products, convenience products and value-added products represent a significant growth potential for new and novel fruit varieties meeting these demands.

Product differentiation on the basis of health components is critical. Future market opportunities lie in extending the harvest season and abilities to supply the market 12 months of the year. Opportunities also exist to develop new varieties specifically targeted at processing for fruit-based products (food, nutraceuticals, textiles, medical).

5. Sustainable Horticultural Systems

Current horticulture programmes are in the process of combining economic performance criteria such as the yield or gross margin and quality-based research with sustainability research, which by its very nature involves economic, environmental and social aspects in an inter-related whole. The growing emphasis on environmental impacts of our economic activities has fed consumer concern, not only for product standards (is it safe to eat?) but also more recently for process standards and good farming practices, i.e. how the product is produced (e.g. EUREPGAP). There is a need to quantify both short-term and long-term environmental impacts of existing and future changes in horticultural practice.

There is a major trend towards a desire at personal, national and international levels to be environmentally responsible consumers, thus reducing adverse impacts on the environment. There are two aspects to this trend, a more objective aspect "eco-impact" and a more subjective one "eco-image". Both are significant and linked to a personal health trend.

⁵ Rabobank 1999

Eco-impact

Contamination of soil and water, with consequent loss of fitness for current uses, is an increasing problem.

Demand for the world's increasingly scarce water supply is rising rapidly, challenging its availability for food production and putting global food security and risk⁶. Scarcity of water will have increasing economic implications for production, creating the need to develop systems for efficient use of available water. Irrigation efficiency globally is estimated at 43 percent. In water short regions efficiency is 58 percent, and in water rich regions is as low as 30 percent.

Soil contamination has only recently become an issue in New Zealand. There is an emerging willingness to take action to define, quantify, and mitigate the hazards posed. Historically in New Zealand hazardous wastes have either been ignored or disposed of to landfill. World-wide the scale and extent of contaminated sites has resulted in legislative action and cleanup programmes. The expenditure will be significant. There is a growing trend towards the use of *in situ* bioremediation methods to address contaminated sites as it is considered cost-effective when compared to thermal, chemical or physical technologies.

Pest, weed and disease pressures will continue to impact on health, productivity and market access, with an increasing need for low-impact control measures to protect the environment and the economy. The continued use of chlorinated pesticides in tropical and subtropical areas has seen an increase in the accumulation of these pollutants in the global food chain. Better agricultural practice will address this.⁷

Eco-image

Value systems play a vital role in determining social priorities, both locally and globally. Thus attitudes outside New Zealand have an impact on our production systems for food and fibre, especially with respect animal welfare. This aspect is also evidenced by trends towards a sense of "responsible consumption" at a personal level (e.g. recycling, assurances that sustainable production practices have been followed), by a perception that natural is better (e.g. organics, resistance to GMOs), and by a sense that native flora and fauna are part of our heritage need to be protected. Also significant in this respect, is the issue of indigenous culture and values, both globally and within New Zealand.

Consumer, society and regulatory pressure for environmental sustainability

The issue of food safety has created many areas of concern for the horticulture sector including organic production, sustainability, traceability, regulations, trade various, marketing and biotechnology⁸. Consumers want to know that their food is safe, that they find out where it came from, and how it was produced and who handled it.

Semi-closed systems, low chemical usage, IPM, etc -- the major trend is perhaps more in the organics pathway than organics itself and may be a greater trend than organics alone.

Market and consumer pressure

Forecasts of growth in the organics sector are underpinned not only by increasing consumer awareness of environmental, health, nutrition and food safety issues but also by concern

⁶ *Global water outlook to 2050. International Food Policy Research Institute*

⁷ *Environmental Performance Indicators Programme. Ministry for the Environment*

⁸ *Rabobank Report 2002*

over genetic engineering and the aggressive promotion strategies being undertaken by major retail groups (OPENZ).

Research conducted by Otago University found that the global organics market was estimated at just over US\$20 billion in 2001 with an expected annual growth rate of 20 to 25 percent (but trends are flattening in "mature markets" such as Sweden). Growth in non-organic food sales are expected to average 3 to 5 percent per year⁹.

Organic marketing trends include organic supermarkets, biodegradable packaging, convenience organic foods, and sales through the internet. Supermarkets are the fastest growing organic outlets¹⁰. In most countries organic market shares in fruit sales are estimated at 3 to 5 percent higher than for other organic segments. New Zealand's organic exports are forecast to reach \$500 million by 2006.

Currently fresh fruit represents the largest segment of organic export products in New Zealand -- making up 77 percent of exports which consists of approximately 50 percent in pipfruit and 50 percent in kiwifruit. Organic exports exceed \$70 million of export revenue per annum. Challenges in organics include productivity levels and long-term environmental sustainability.

6. Food safety

Proof of claims is becoming a key requirement, especially in the health benefit area. Labelling is required for nutritional/compositional information including GMO. ISO certification and tracking of food production for safety reasons is increasing. There is a shift from what a product is to what the product can do. The world is indulging in a proliferation of standards¹¹. There is a growing desire for "safe" and "natural" foods. Growth in the organic food sector is a consequence of this desire.

The development of safe processes and methods of detection of unsafe processes is becoming increasingly important.

7. Increasing Competition

Traditional international trade barriers are being lowered, resulting in an increasing amount of international global competition.

New Zealand suppliers therefore need to differentiate themselves from their competitors by demonstrating better cost structures, higher quality and consistency of product, ability to meet demand, efficient production systems, flexibility to incorporate new technologies and trends, continuous and faster stream of new products, rapid technology change and adoption, and decreasing product life cycles.

Retailers want suppliers who are actively integrated into the entire production-to-consumer cycle¹².

In the 1990s world fruit production increased 39 percent which is more than twice the rate of population growth¹³.

⁹ *Willer and Yussefi 2002, Otago University*

¹⁰ *World Market for Organic Fruit and Vegetables, ITC 2001*

¹¹ *Trends Fresh Produce 2002, Rabobank; Trends Now Changing World, Futurist 2001*

¹² *Rabobank, 2002*

¹³ *World Apple Review, 2002*

A major consequence may be the necessity for reducing costs as a way of staying competitive. "For the US tree fruit industry to compete globally, we must reduce the cost of production of its highest quality fruit 30 percent by the year 2010". This leads to efficiency gains through technology innovation.¹⁴

8. BioDigital

The exponential increase in the power of IT in its broadest sense, with its ever-shrinking physical size of hardware and increasing affordability, combined with new technologies for high throughput molecular sequencing and screening, is fast creating a new world where the monitoring and management of biological systems is available for real-time decision making. This covers a continuum from the most basic research, to production, sales, regulatory roles and beyond to consumer behaviour. There is access to huge amounts of data, knowledge and information world-wide, as well as the ability to process this data across international boundaries. Modelling enables "virtual experiments".

Technology advances will extend the self-monitoring of health -- available now for diabetics -- to personalised dietary and drug requirements and integrated health and leisure regimes for a range of complex conditions. Psychology, and detailed understanding of the brain's functioning, interfaces with disease prevention and customisation of food and other aspects of daily life. The new knowledge of intelligence and the brain has thrown out new ideas for the IT industry creating a leap in the processing speed of computers. Sophisticated treatments and diagnosis will become widely available across the developed and developing world's based on miniaturisation (nanotech), data handling and modelling systems. Intelligent machines that are part material and part biological will be ingested and able to move through the human body and cure disease and replace faulty organs. Gene technologies will be used to repair inheritable disease conditions until genetic disorders such as cystic fibrosis have little impact on society. In agriculture new micro diagnostic kits will give growers the ability to monitor plant health status at the cellular level and take appropriate steps, in the same way that they now use meteorological data and gross measures of pathogen load, to schedule pesticide spraying.

The reducing cost and increasing power of computer-based analysis will make current new technologies the preferred tool of regulation and monitoring internationally. This will include food tracing systems, and indicators of passage through specific environments. Nonhuman forms of life will be monitored, diagnosed, rescued and the planetary diversity enhanced using such technologies.

9. Convergence of Sectors

Companies moving into new areas across traditional boundaries means that agricultural commodities are now being developed into value added ingredients or niche products¹⁵. Biotechnology is impacting on the fresh product market. Rapid development of enough product and diversity to satisfy the market is important and biotechnology facilitates this, particularly in the area of breeding. Plants and microbes are starting to be used as factories.

Convergence of food, health of biotech areas is resulting in new products (value-added) and companies moving into new areas e.g. functional or fortified foods/ nutraceuticals; vaccines

¹⁴ *The technology roadmap for tree fruit production, Washington Tree Fruit Commission*

¹⁵ *Rabobank, 2002*

through food products; (plants as factories: biopharming, biomaterials, biocatalysis, biofuels, biofermentation), slowly replacing the petroleum based chemical industries.

Agribusiness/commodity players are diversifying into value-added ingredients (e.g. ADM, Cargill); large chemical companies are developing or purchasing food units (e.g. Roche, BASF, DuPont, ICI, DSM etc.¹⁶)

Functional ingredients future market estimates are for 8 to 14 percent growth and to be worth US\$80 billion by 2011¹⁷.

"Many of the country's (New Zealand) biotech firms take their starting point from New Zealand's heritage of agriculture and primary industry expertise"¹⁸. This can also be translated as having and multidisciplinary, flexible approach to science and technology development.

Acknowledgement:

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This case study is one of a 21-part case study series aimed at demonstrating the value of science and innovation in New Zealand's leading edge bio-science industries... and their significance to New Zealand.

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¹⁶ Focus 2002: Food Additives/Nuraceuticals; Pamela Sauer; Chemical Market Report, June 2002

¹⁷ HortResearch internal report, 2003.

¹⁸ Agritech and Life Sciences, Trade New Zealand