Current Situation and Future Challenges Facing the Production and Marketing of Organic Fruit in Oceania

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Keywords: apple, kiwifruit, organic production, market premium, physiological sustainability

Abstract

Australia has almost half of the global area in managed organic production, much of it low productivity land for cattle production. Organic food accounts for 1 percent of the total food market in Australia, however the demand still exceeds production so little organic food is exported. Major supermarkets in Australia tend not to have developed organic products as part of their marketing strategic position, so that demand for organic food remains outside the mainstream food industry. Nevertheless beef, carrots, citrus, wheat and wine are considered target products for priority development in organic production systems within Australia. New Zealand produces organic food on 46 000 hectares, much of it grown for export. Fresh fruit accounts for 71 percent of all organic exports with kiwifruit (*Actinidia deliciosa* cv. Hayward) and apple *(Malus* × *domestica)* making up the bulk of this category. Production systems for kiwifruit and apples in New Zealand have moved from conventional to either Integrated Fruit Production (IFP) or organic production systems over the last decade in response to market signals rather than to government subsidies. Organic apple and kiwifruit production systems typically yield less than conventional or IFP systems. Market premiums for organic fruit have until recently compensated for reduced yield. Declining premiums can quickly erode the profitability of current substitutional organic production systems. For kiwifruit, organically acceptable alternatives to hydrogen cyanamide are needed to enhance bud break and flowering and to fumigation for a key quarantine-actionable pest. For apple, the lack of alternatives to sulphur-based fungicides and of acceptable thinning technology limit profitability. Continued expansion of organic apple production will be dependent on development of orchard systems that integrate resistant cultivars and ground cover management systems, that optimise nutrient and water status of trees, and that enhance bio-control and bio-diversity.

INTRODUCTION

The global market for organic food production is conservatively estimated at US$20 billion, with annual growth rates currently between 20-35 percent (Fielke, 2001). While customer willingness to pay high premiums seems likely to decline even in mature markets, e.g. in the United Kingdom, the retail premium still averages around 10-20 percent. According to a recent survey (Yuseffi and Willer, 2002) more than 17 million hectares is managed organically worldwide. The majority of this area (7.7 million hectares representing 45 percent of the total) is located in Australia (Figure 1), most of which is large areas of low productivity rangelands for cattle production (McCoy and Parlevleit, 2000). By comparison only 46 000 hectares of agricultural land were managed organically in New Zealand in 2001, representing 0.28 percent of the total area in agricultural production. Per capita consumption of organic food was similar in New Zealand and Australia in 2002 (approx. US$9 per annum), still much lower than many European Union (EU) markets e.g. US$100 in Denmark in 2001 (Yuseffi and Willer, 2002). Both Australia and New Zealand hold third country listing for organic exports to the European Union, New Zealand only achieving this status in July 2002. Third country listing avoids the need for exporters to obtain import licenses from individual states within the EU, providing government–to-government assurance that organic products

Proc. XXVI IHC – Sustainability of Horticultural Systems
Eds. L. Bertschinger and J.D. Anderson
Acta Hort. 638, ISHS 2004
Publication supported by Can. Int. Dev. Agency (CIDA)

have been produced under equivalent rules to current EU regulations. A large number of supermarket chains in the United Kingdom and other countries are demanding organic product lines to complement their conventional supplies as part of their preferred supplier relationships.

AUSTRALIA

The major horticultural crops grown organically in Australia in 2000 were oranges, bananas, potatoes, carrots, grapes, avocados and broccoli. Estimates of annual growth of the domestic market for organic food in Australia are lower than estimates for the USA (20-25 percent), Japan (20 percent) and many EU countries. Average premiums on the domestic market for organic food in Australia were around 35 percent in 1995 (McCoy and Parlevleit, 2000). Organic food accounted for approximately one percent of the total food market in Australia in 2000. Fruits/nuts and vegetables/herbs accounted for two-thirds of retail sales of organic food in Australia in 1995. Nevertheless demand for organic food on the local market is greater than domestic production, so that the value of exports have not risen significantly since 1995. Unlike many other countries where supermarkets have become the major outlet for organic food, specialty stores and health food shops have remained the main retail outlet in Australia, although home delivery services appear to be gaining popularity in several larger cities. McCoy and Parlevleit (2000) suggest that demand for organic products in the Australian domestic market will remain outside the mainstream food industry until major supermarkets seriously develop organic products as part of their marketing strategic position. This trend has been observed in many European markets, where mainstream supermarkets use products labelled as 'organic' to attract customers – the so-called halo effect. Australia imports some organic foods, mainly grocery lines, onions, sugar, kiwifruit and frozen vegetables. A recent report evaluated the market potential for organic agricultural products (McCoy and Parlevleit, 2000), highlighting beef, carrots, citrus, wheat and wine as target products for priority development.

NEW ZEALAND

During the period from 1997-2002 the annual growth rate of New Zealand's domestic market for organic products was estimated to be 42 percent. The market for organic food products in New Zealand is currently estimated to represent one percent of the total food market, a similar level to that in Australia. This compares to estimates ranging between two and three percent for Denmark, Austria and Switzerland (Yussefi and Willer, 2002). There has been a significant shift in the balance between supermarket and specialist retailing of organic produce in New Zealand, with supermarkets increasing their market share from 27 percent to 57 percent of retail value between 2000 and 2002 (Campbell and Ritchie, 2002). The domestic market for organic food in New Zealand is predicted to double in value in the next few years (Campbell and Ritchie, 2002). Per capita spending on organic food increased by 388 percent in New Zealand between 1997 and 2000, a faster relative rate of increase than all other countries surveyed by Yussefi and Willer (2002). The value of the domestic market for organic food in 2002 was equivalent to the value of organic exports from New Zealand in 2001. However, even the combined domestic and export figures for New Zealand would only satisfy 0.33 % of the global market for organic food. This increased demand for organic food is attributed by some to be in response to public debate on genetic engineering and genetic modification of food crops.

Organic production of horticultural crops in New Zealand has developed without the government incentives that have stimulated organic agriculture in many EU countries since the early 1990's. The free-market policies espoused by successive New Zealand governments since the mid-1980's signalled the end of subsidised agriculture with the fate of agricultural production systems becoming more directly linked to the ability of those systems to adapt to market signals. New Zealand's primary production systems are predominantly focused on export markets in Europe, the United States, Australia and

Japan. Consumer demand in the highly differentiated food markets of Europe, Asia and North America is increasing for food and agricultural products that are perceived to be healthy and are derived from production systems that have low impact on the environment e.g. EuroRetailerProduce Working Group-Good Agricultural Practice (EUREP-GAP). Producers in the USA and New Zealand have been the quickest to respond to these market demands (McCoy and Parlevleit, 2000). The primary exports of organic horticultural crops from New Zealand in 2001 were fresh fruit with 71 percent of total organic exports, and processed foods including vegetables with 14 percent of total organic exports (Fig. 1). Europe is the major destination for exports of organic food from New Zealand (40 percent of total), while Asia and North America account for 30 percent and 21 percent respectively (Fig. 2). Apples and kiwifruit are the major organic fresh fruits exported from New Zealand.

Organic Kiwifruit Production in New Zealand

Production of organic kiwifruit in New Zealand for export increased from 13,000 trays in 1991 to 3.1 million trays in 2001 (Table 1), an increase from less than 0.01 percent to 5.8 percent of the total production of green kiwifruit. During this period there was a move to reduce pesticide use in conventional production systems and deliver fruit to the market that was without detectable pesticide residues, a move that developed into the current ZESPRI™ GREEN production programme. It was argued that significant cross over benefits existed between organic and non-organic (ZESPRI™ GREEN) production systems (Campbell et al, 1997). The reduced-pesticide program provided many growers with a stepping stone for conversion to organic production. It increased access to pest monitoring facilities and promoted the use of 'soft' pest management options including *Bacillus thuringiensis* and oils. However, production of kiwifruit on organic orchards averages only 4500 trays per hectare compared with average production of 6000 trays per hectare on non-organic orchards. This difference is due, in large part, to the use of hydrogen cyanamide by non-organic growers to promote bud break and flowering. Additionally, production costs are higher on organic orchards because they require more expensive pest control methods and a more intensive management system.

The three major markets for New Zealand kiwifruit are Japan, Europe and North America. Japan has traditionally been the highest paying market, and the destination of up to 65 percent of all organic kiwifruit exported prior to December 2001. Export volumes of organic kiwifruit were 3.1 million trays in 2001, an increase of 238 % over the previous season (Table 1). As a result of this dramatic increase only 27 percent of organic kiwifruit went into Japan in 2001; much of the extra fruit was exported to lower value markets. Returns for organic kiwifruit were lower in 2001 for several reasons including (a) the large volume increase leading to a lesser percentage sold in the premium Japanese market, (b) the fruit size profile being too small and (c) the detection of a quarantine-actionable pest (*Asynonychus cervinus*) on arrival in Japan. This third factor was responsible for 85 percent of organic fruit entering this market losing its organic status due to a requirement for fumigation. There has also been a recent trend for higher returns from the reduced pesticide ZESPRI™ GREEN programme. The combined effect of these trends in returns resulted in either static (1998-2000) or declining (2001) premiums for organic fruit. Returns for ZESPRI™ GREEN fruit were higher in 2000 compared with the previous year, resulting from lower export volumes compared with the previous year as vines were grafted over from the standard green kiwifruit to a new yellow fleshed variety (ZESPRI™ GOLD). While returns for ZESPRI™ GREEN and ZESPRI™ GOLD fruit continue to remain high growers see little reason to commit to organics, citing the ability to sustain yield and size as the key issues.

Although organic growers have argued that increasing supplies of fruit from a reduced-pesticide production system such as ZESPRI™ GREEN into the market would undermine consumer demand for organic product, the major New Zealand kiwifruit marketer maintains that having an organic category is an important component to their overall marketing plan (Zespri, 2003). The marketer claims that organic and non-organic

products can co-exist in overseas markets because they appeal to different wholesalers and different consumers. However, organic growers themselves believe the marketer has a conflict of interest by marketing both organic and non-organic fruit. Early in 2002 the marketing agent proposed to cross-subsidise organic growers NZ$2.30 per tray to maintain the viability of the organic category in their product mix, financing this "purchase differential" through a subsidy from ZESPRI™ GREEN returns. The marketing company argued that ZESPRI™ GREEN returns could be pulled down by as much as NZ$10 million in 2002 if organic growers returned their orchards to conventional production. Eventually, under pressure from ZESPRI™ GREEN growers, the marketer settled for a NZ$0.50/tray differential for organic fruit. The initial differential did not, according to ZESPRI™ GREEN growers, provide clear market signals for either production system. The premium for organic kiwifruit in the current (2002) selling season is NZ$1.50-1.60 per tray, and when this is combined with the NZ$0.50 per tray price differential is still below the NZ$2.30 per tray premium that organic growers say they need to remain viable.

Organic Apple Production in New Zealand

New Zealand produces less than 1 percent of the world's apples but accounts for 6 percent of the international apple trade; with 90% of Class I fruit exported the industry is strongly export-focussed. In response to market signals the New Zealand apple industry completely eliminated conventional production systems during the period from 1995 to 2001, moving to either integrated or organic production systems (Figure 4). This move was underpinned by disease and pest management technologies that had flowed out of government-funded research programs since the late 1960's (Figure 5). The number of orchards beginning the conversion process to fully certified organic production increased rapidly to nine percent of the total between 1997 and 2001, as growers were attracted to high premiums for organic fruit. In 2002 however the number of new orchards entering conversion to organic production declined to zero due largely to higher returns for fruit from the integrated production systems. The dilemma facing growers contemplating conversion is how to maintain orchard profitability during the conversion period; some may even incur losses due to lower productivity and the absence of premiums for conversion fruit. Currently, many growers within the apple industry simply can not afford to convert their orchards to organic production.

Disease management costs are similar for organic and IFP apple orchards, but pest management costs, mainly for codling moth *(Cydia pomonella)* and leafroller (*Epiphyas postvittana*) control, can be up to NZ$500 higher per hectare for organic. Overall, the costs of production on organic orchards may be up to NZ$4,500 per hectare higher compared with IFP orchards. The major factors contributing to this increase are the already mentioned increased pest management costs, the need for additional hand thinning, the cost of certification, and additional nutritional input costs (Walker and McArtney, 2001). The major factors affecting profitability of organic apple orchards are the absence of acceptable technology for fruit thinning and the negative impact of phytotoxic sulphur-based fungicides on fruit size, quality, and yield. Fruit size of 'Royal Gala' and 'Braeburn' under organic production may be reduced by up to 9 % and 30 % respectively. Based on average grower costs and returns for IFP, conversion and fully certified organic orchards, the profitability of fully certified organic orchards was at least 2-fold greater than IFP orchards in 2000 (Walker and McArtney, 2001). However, returns for fruit from orchards in conversion were below the cost of production, especially for the cultivar 'Braeburn' (Figure 6) where the significant reduction in fruit size and yield and higher production costs were not compensated for by any market premium. The lack of any premium during conversion and reduced productivity are considered the major factors limiting expansion of organic apple production in New Zealand.

Current organic apple production systems in New Zealand are largely substitutional in nature i.e., they rely on orchard systems (row spacing, cultivar and rootstock choices, orchard floor management systems) that were adopted by conventional

orchards. In the future organic apple production systems will need to be redesigned to move away from the use of sulphur-based fungicides that negatively impact yield and productivity. Clearly therefore, future systems will need to incorporate novel cultivars with natural resistances to major fungal pathogens such as apple scab *(Venturia inaequalis)* and powdery mildew *(Podosphaera leucotricha).*

FUTURE CHALLENGES

There are many challenges ahead for organic fruit production in Oceania. In Australia it has been suggested that increased consumption, and therefore production, of organic products will not occur until major supermarkets seriously adopt organic products as part of their marketing strategic position. While several organic food products have been highlighted as having significant export opportunities for Australia, limited production appears to be the major impediment to capturing those opportunities. Industry wide trends in production systems for kiwifruit and apple production described in this paper highlight that where there are clear signals from export markets New Zealand fruit growers were prepared to abandon conventional production systems and rapidly switch to reduced pesticide and organic production systems. It is not clear if the "cleaning" of fruit production from conventional to reduced pesticide systems (Figure 7), as demanded by consumers in many of New Zealand's major export markets, has resulted in increased fruit value. What is clear however is that without the transition to "cleaner" production systems access to those markets would have become increasingly difficult.

Within the kiwifruit industry in New Zealand there is increasing conflict between the need for organic growers to maintain profitability and the need for the marketing company to provide buyers in export markets with the mix of organic and non-organic products they demand. These factors were largely responsible for a decline in the number of organic kiwifruit orchards between 2000 and 2001. The conflict may be resolved either by finding solutions to the technical production problems that are responsible for lower returns on organic orchards, or merely by subsidising returns to organic growers as the marketer suggests. The first solution is arguably more sustainable than the second one in the long term.

Similarly within the New Zealand apple industry the number of orchards entering conversion to organic production has slowed, due to an improvement in returns for IFP fruit together with the greatly decreased or even negative profits sustained during the conversion process. The lack of financial incentives to compensate for reduced yield and quality during the conversion process is a significant barrier to growth of the organic apple industry in New Zealand. Maintaining acceptable nutrient balances in organic apple orchards, particularly of nitrogen and potassium, are expected to be problematic in future years (refer to paper by Palmer and Wunsche in this Symposium). Alternatives to sulphur-based fungicides need to be found for sustainable organic apple production systems where control of scab is an issue. There also needs to be greater awareness and sympathy of insect, disease, weed, and fruit tree ecology as integral elements of a more diverse production system. In the longer term however organic production systems need to evolve beyond their current level where pest and disease control is based on substitution with acceptable "organic" chemistry. This will demand redesign of current orchard systems so they are more suited to the challenges of organic production, incorporating cultivars derived from classical hybridisation breeding that have natural resistances to major pests and diseases.

Unlike many European countries where subsidies supporting organic production are provided as part of a suite of agri-environmental measures, the New Zealand fruit sector's increase in organic production has largely been in response to market signals. Some EU member countries also provide incentives for conversion while in New Zealand this cost has been identified as a significant barrier to adoption of organic production (Walker and McArtney, 2001). Scientific and technical support for organic production in New Zealand is also limited by current government science policy that is moving research funding away from the primary sector. This, together with the earlier loss of a

government-funded technical advisory service, suggests that the current success of New Zealand's organic fruit sector has occurred without significant government assistance or leadership.

Interactions between organic and non-organic groups (growers, researchers) within the horticultural sector have until recently been typified by an atmosphere of ridicule and distrust. It has been proposed that organic and conventional agriculture belong to different paradigms. According to this view organic agriculture is characterised as an holistic enterprise, with the whole farm seen as one integrated, dynamic system whereas conventional agriculture is characterised by an approach of control and reductionism, emphasising treatment of symptoms instead of prevention in management (Wynen, 1996). Generally speaking, these opposing paradigms have also been adopted when defining the research methods applicable to each production system. Proponents of organic agriculture often criticise a lack of "targeted" government-funded research, this criticism forming the basis for a call for establishment of dedicated organic research facilities e.g. the current proposal for a Co-operative Research Centre (CRC) for Australian Organic Systems. The recent trend towards "cleaner" production systems (IFP and organic) has been underpinned by technology developments that evolved from research programmes that were focussed on production issues in conventional systems and reductionist in their methodologies. Furthermore, progression beyond the current substitutional organic production systems will not occur without the availability of novel cultivars with market acceptance that have natural resistances to pests and diseases. For apples at least, these cultivars are being developed within classical breeding programs at various institutions around the world that are not dedicated to organic research.

ACKNOWLEDGEMENTS

This work was funded by the Foundation for Research Science and Technology contract CO6X0212.

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Tables

Table 1. Supplies and returns of non-organic and organic green kiwifruit during the years1991-2001.

Year	Non-organic green kiwifruit[Z]		Organic green kiwifruit		
	Trays submitted (x 10^6)	Supplier return (NZ$/tray)	Trays submitted (x 10^6)	Supplier return (NZ$/tray)	Premium (%)
1991	59.8	6.08	.01	10.45	72
1992	62.3	3.85	.02	7.29	89
1993	54.8	4.18	.05	7.03	68
1994	55.9	4.63	.41	5.88	27
1995	58.7	4.22	.62	6.23	48
1996	62.4	4.36	.75	7.39	69
1997	60.0	4.36	.85	7.52	72
1998	59.0	6.48	.96	9.20	42
1999	57.9	6.80	.90	9.60	41
2000	48.4	7.88	1.3	9.95	26
2001	53.1	6.77	3.1	7.11	5

[Z] Production systems for non-organic kiwifruit changed during this period from a conventional system to a reduced pesticide system (ZESPRI™ GREEN).

Figures

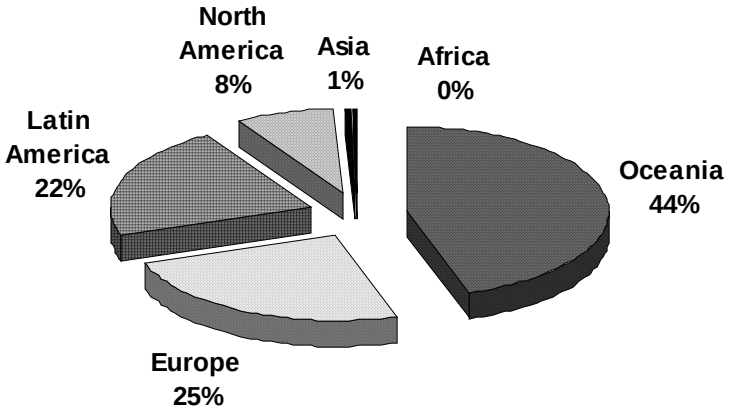

Fig. 1. Area of each continent in organic production (% of world total). Source: SOEL Survey February 2002.

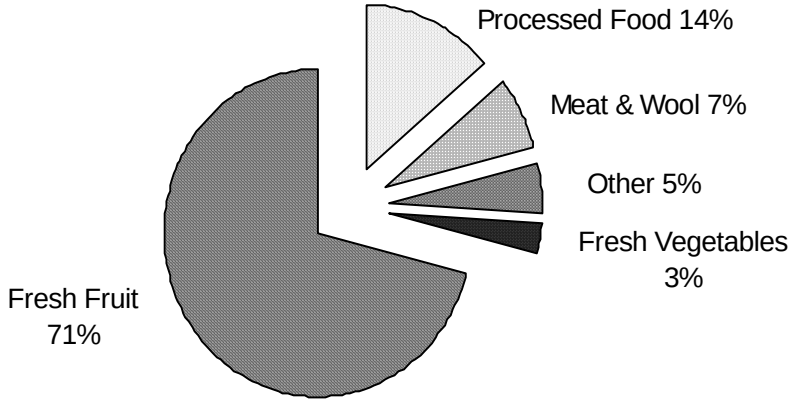

Fig. 2. Organic food exports from New Zealand by product. Source: OPENZ Member survey 2000/2001.

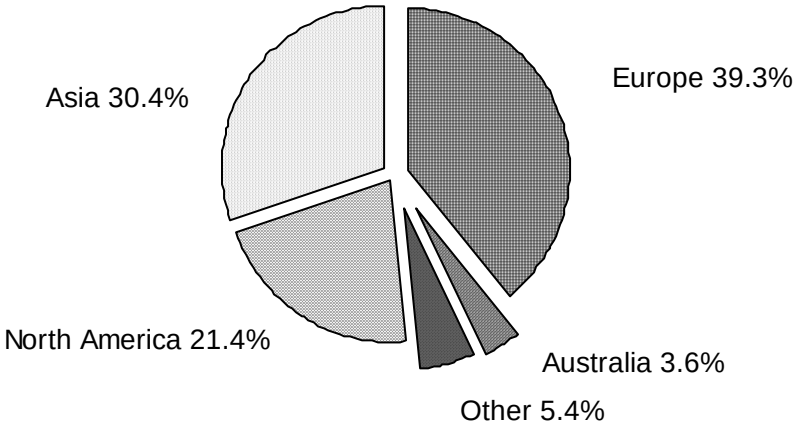

Fig. 3. Organic food exports from New Zealand by market. Source: OPENZ Member survey 2000/2001.

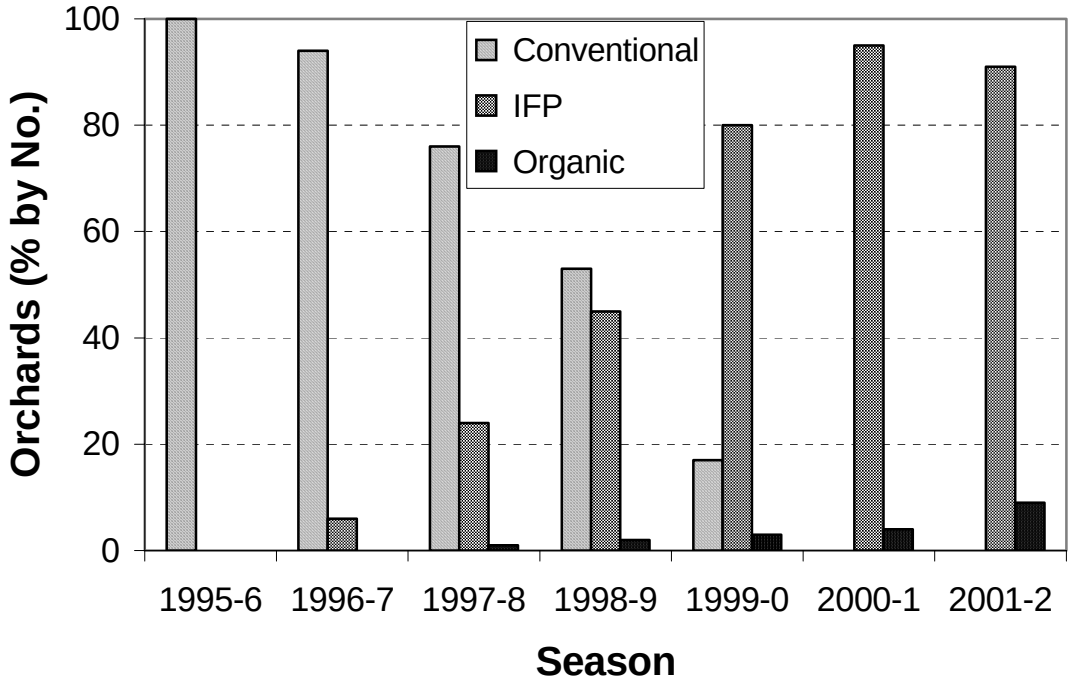

Fig. 4. Proportion of apple orchards in conventional, IFP and organic production in New Zealand during the seasons 1995-6 and 2001-2.

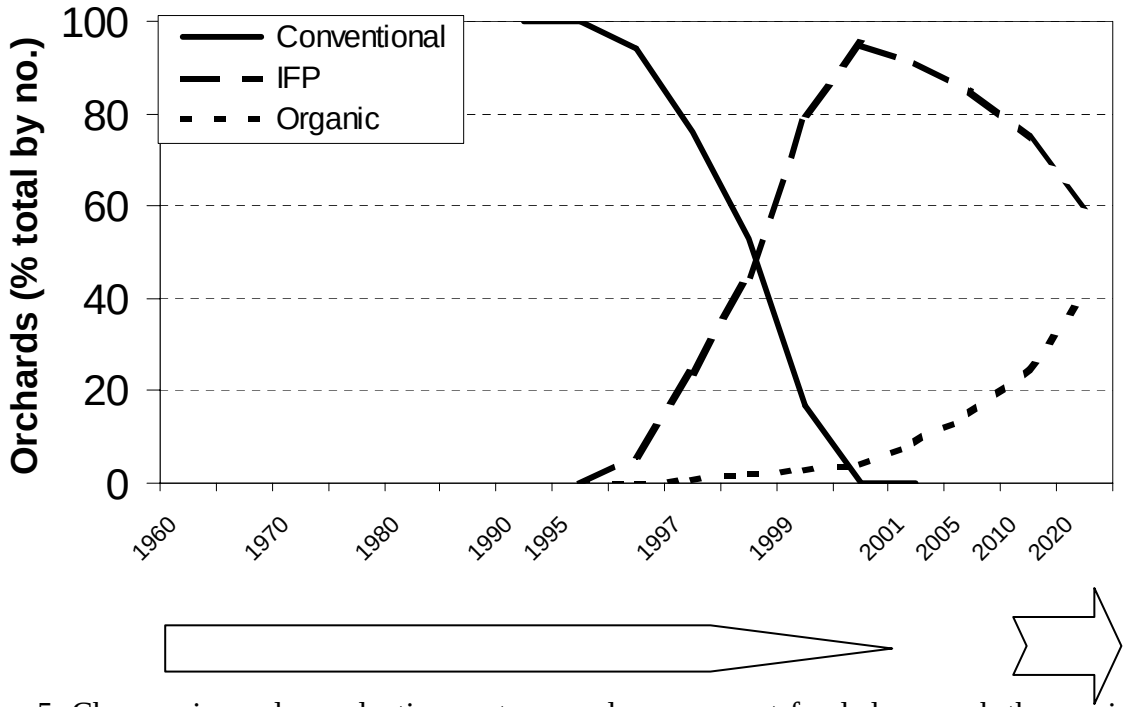

Fig. 5. Changes in apple production systems and government funded research themes in New Zealand from 1960 to 2002, and projected to 2020.

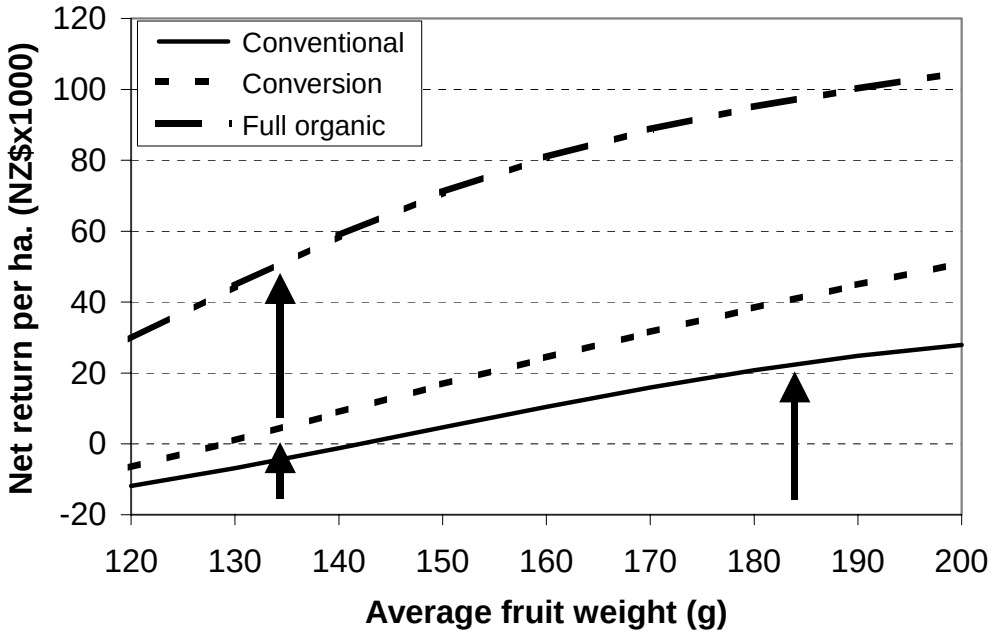

Fig. 6. Net return per hectare for 'Braeburn' apples in Hawke's Bay, New Zealand given the expected average fruit weights of 135 g for conversion and organic crops compared to 187 g for IFP crops. Source: Walker and McArtney (2001).

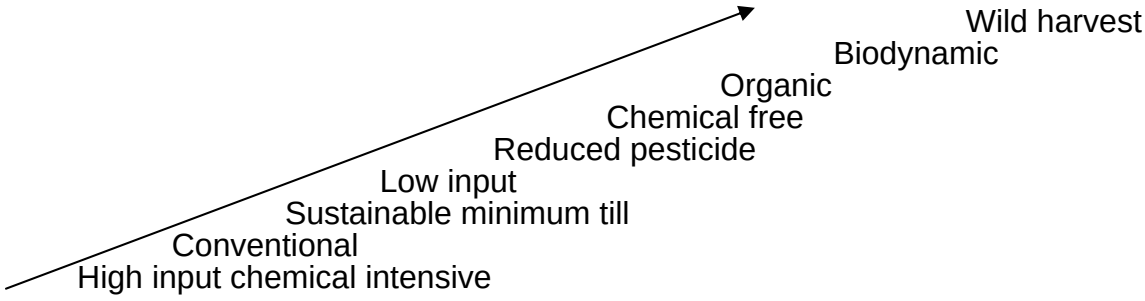

Fig. 7. The clean continuum. Adapted from McCoy and Parlevleit (2000).