Changes in East Asian Food Consumption: Some Implications for Australian Irrigated Agriculture

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This paper reviews the implications of economic growth for food consumption in Asia, the East Asian supply responses and the determinants of Australian competitiveness in meeting Asian demand from production in Australia. Our special interests are to draw out some implications for Australia’s irrigated agriculture and for the organisation of the export business of that sector of the economy. A key question is the scope for increased exports of fresh rather than processed products.

Sources of Australian competitiveness include land, climate, water, proximity and seasonal complementarity to Asia. The ‘clean and green’ image of Australia is an asset although one vulnerable to abuse; so the coordinated national campaign to exploit it faces the same free-rider problems as other common-property resources.

The most important structural aspect of the export business is the organisational form of the industry and its component enterprises. The differences between organisational forms common in the growing and processing phases of food production can be traced to quality control issues. The best organisational forms for export of processed compared to fresh food may not be the same but the absence of appropriate forms of organising export business for fresh products is the major disadvantage of Australian horticulture.
CHANGES IN EAST ASIAN FOOD CONSUMPTION: SOME IMPLICATIONS FOR AUSTRALIAN IRRIGATED AGRICULTURE

Introduction

In this paper, we review some the implications of economic growth for food consumption in Asia, the East Asian supply responses and the determinants of Australian competitiveness in meeting Asian demand from production in Australia. Our focus is the implications for Australia’s irrigated agriculture. A major concern is the type of food likely to be in greatest demand: the likely extent of Westernisation of Asian diets and whether fresh or processed food will be most sought after. The second of these issues will affect the balance between horticultural and broad-acre (cereal, dairy and meat) production.

Assessment of the shift in that balance is the motivation for our interest in this paper in the efficiency in use and allocation of scarce irrigation-water resources. The use of Australia’s water resources has also attracted considerable policy attention and debate. There have a number of reports and assessments of water pricing options (such as Watson 1995). This paper provides some material about the context in which those debates are taking place. We also draw some implications for desirable institutional developments in the water allocation system.

There is another interesting set of issues concerning Australian involvement in offshore production, for example via the export of technology and other services. We note these opportunities but they are not a main theme. Finally, we compare some commercial initiatives designed to contribute to growth in food exports.

Food demand in East Asia

The McKinsey model

The impact of economic growth on food consumption patterns in East Asia is complex. Its implications for the Australian food export industry have become a hot topic of discussion within the horticultural industry in Australia in recent years. In this section, we summarise the main threads of the McKinsey school of thought and draw out some implications for the demand for irrigation services. In the next section of this paper, we discuss some views that carry different emphases.
**Growth in per capita food consumption**

White identifies a particular relationship between food consumption per capita and GDP per capita which includes two distinct growth phases (White 1992, p. 22). The explanation of this two-phase growth in consumption appears to be that the first is to do with satisfaction of nutritional needs and the second has more to do with convenience, health and image concerns of relatively wealthy consumers.

Hassall & Associates report a ‘rough rule of thumb’ that ‘when per capita income is below $US4,000, a 10% rise in that income produces an 8% increase in the demand for farm products. Above that level of income, the impact declines quickly. Richer people spend more on food but the additional expenditure is largely on packaging and presentation’ (Hassall & Associates 1992, p. 2).

Consistent with this observation, FAO data indicates that in Asian economies, the increase in calorie and protein intakes is minimal above GNPs per capita of US$4,000–6,000 (Taylor and Findlay 1996). Similar trends in food consumption patterns are discussed by Garnaut and Ma (1992) and by Rae (1995).

**Dietary change**

Most of the current literature points to two trends in dietary change in developing countries: change in nutritional balance and Westernisation of diet.

**Change in nutritional balance**

The McKinsey school emphasises the trend across a wide range of ethnic groups towards animal protein foods; towards foods high in fats, oils and sugar; and towards processed foods. We discuss these trends in more detail below.

**Westernisation of diet**

While much of the food imported goes into traditional dishes, the McKinsey school has it that there is an increasing acceptance of Western products. The consumption of ice cream and Coca Cola, for example, has shown a rapid increase in many communities. White quotes a further example of rice consumption in Taiwan falling 30 per cent (31 kilograms) during the 1980s and a simultaneous 30 per cent (7 kilograms) increase in wheat-based products (White 1992, p. 27).
The transfer from the direct consumption of cereals to its consumption as part of processed products such as meat-based pies is a common development as incomes increase.

**Change in retail channels**

Changes in food consumption patterns are associated with developments in food retailing systems, which has implications for strategies for penetration of these markets by foreign suppliers.

White and others emphasise the importance of the rapid modernisation of retail channels — for example, the rapid growth of ‘modern retailing’ in Hong Kong — in determining appropriate methods of entering the Asian markets. Modern retailers are defined as supermarkets, hypermarkets and convenience stores (such as 7-Eleven). White has used industry estimates to position other countries on the same trend — in the shape of an S-shaped curve — that was followed by Hong Kong. This trend has two important implications. First, it is likely to have the effect of reinforcing Western patterns of food consumption. One reason for this is that modern Western food products have evolved in parallel with the retail channels and are well suited to their logistic and marketing requirements.

The second implication of the change in retail structure is that their exploitation requires a sophisticated corporate marketing strategy. White emphasises this point strongly (1992, chs 3 and 4). He argues that the traditional Australian approach of marketing bulk, undifferentiated raw product will not be successful. Marketing success will require extensive marketing research so that products can be targeted to specific countries, marketing channels and retail firms. The general strategy will be to build ‘preferred supplier relationships’ with the retail chains and to ride their growth curve. This will involve cooperating with the retailer in research and product promotion, particularly in-store data collection and promotion.

White points out that numerous Australian food manufacturers adopt very sophisticated channel marketing strategies in Australia but few have been successful in extending those strategies into Asian markets.

While Australia’s food export performance is often argued to be constrained by higher labour, waterfront and shipping costs, White argues that lack of scale of the would-be exporter is a common element. White, for example, speculates that a joint venture between Goodman Fielder, Arnotts and Uncle Tobys might create an organisation of sufficient size to tackle Asian markets effectively (1992, p. 38).
One rationale for the importance of size is that exporting involves a risk. It requires that the exporter incur a new set of sunk costs, above those associated with entry into production for the domestic market. These costs are specific to entry into foreign markets. If the firm’s bid to export failed, these costs could not be recovered. Examples include market research for the export market (including cultural factors) and investment in local representation. Larger firms may be more willing to bear these costs and the risks associated with failure. In some analyses of export performance, the presence of these sunk costs leads exporters to demand a price premium in the early periods of exporting. However, once entry has occurred, that premium can be lost without inducing the exporter to leave the market. This analysis is used to explain the hysteresis that is sometimes observed in these markets (Grdsic 1994).

This analysis also leads to a focus on strategies for reducing the extent of sunk costs associated with exporting. One strategy to reduce the importance of the sunk costs associated with entry into the export market is to establish ‘insider status’ within the target countries. These include joint ventures with local firms and/or downstream processing facilities. Instate Pty Ltd (1993, p. iv), for example, considers investment in Asian agribusiness development to be the key to Australian export success. Other strategies involving careful choice of organisational form for exporting are noted below.

**Implications of the McKinsey model for irrigation services**

This paper is primarily interested in the implication of these issues for irrigation in the Murray–Darling Basin, which supports the vast majority of Australia’s irrigated agriculture. However, most of the conclusions apply to other river and underground water basins.

The McKinsey model has two significant implications for the type of irrigation services required. The first results from the above-mentioned income effects on the types of food consumed. The emphasis will shift from broad-acre cereal growing towards more intensive enterprises, such as dairying, horticulture, poultry and fish farming. Moreover, the product value per unit of water is usually greater in horticulture than in cereal-growing and, since existing water resources are now more or less fully utilised, this will increase the marginal value of those resources. Consequently, in a free market for water rights, horticulture can be expected to attract water away from pasture, rice and wheat irrigation. This, in turn, will affect the geographic location of production and the type of irrigation infrastructure required.

The second implication is related to the organisational form of the production and marketing chain. Horticultural export industry commentators now agree that vertical integra-
tion of some sort is necessary for success. Taylor (1994, chs 2 and 3) categorises successful vertically integrated export operations into three groups:

- the Statutory Marketing Authority (SMA) system;
- the vertically integrated multi-national enterprise (MNE); and
- the non-ownership vertically integrated (or relationship contracting) structure.

The essential feature of the last group is the close and long-term contracting relationship that is built up between operators along the logistic chain. The model is claimed to have significant advantages in the distribution of efficiency incentives along a complex manufacturing or logistic chain. For example, it is claimed to be a significant factor in the success of the large Japanese manufacturing firms (Sheard and Findlay 1992).

Many successful food exporters combine both ownership and non-ownership forms of vertical integration but the distinction between the MNE and relationship contracting models is crucial to understanding the options available for food export. This is discussed further below.

In the relationship contracting model, there is usually one large ‘client’ firm orchestrating the activities of subcontractors at various points along the production and logistic chain. Typically, the client firm exercises control over inputs to the subcontractors’ operations. In this way it can still exercise buying power and capture economies of scale in monitoring input quality.

This has important implications for input suppliers, including those supplying water. If the McKinsey model for export growth gains ascendancy, whether the corporations grow their own produce or buy it from contract growers, water suppliers can expect increasing corporate involvement in water supply issues. In addition, these firms will be seeking a particular standard of service. In the case of food export, the explanation for this is straightforward. Growing the raw material is only a small part of the overall operation, both in cost and in complexity. The more difficult and more expensive activities are to do with market research and establishment of brands and channel relationships. For example, we estimate that it costs A$15 million to launch a new brand and establish a sales operation in the greater Tokyo area alone (O’Flahertie 1994, p. 55). Figures in excess of A$100 million to establish a global brand are not uncommon. Since the value of the goodwill thus created is very vulnerable to discontinuous supply of product, a firm embarking on marketing campaigns of this magnitude will place a high premium on reliability of input supply.

Firms have two strategies for minimising supply unreliability:
using multiple sources (Chiquita, for example, sources bananas from numerous countries throughout Latin America, the Philippines and Australia) and locating production where input sourcing is most reliable.

This in turn has two implications for the market for irrigation services:

- A supplier who has a reputation for quality control could expect to attract a premium. Quality control in this context includes accuracy in quantities and timing, high water quality and appropriate delivery systems.
- A premium is likely to exist where there is a free market in water rights. A food exporter’s vulnerability would be significantly reduced if that firm has the ability to bid for water rights in a drought to protect its market position. This conclusion supports the current policy initiatives which are understood to favour trading in both long-term and short-term water entitlements within the Murray–Darling basin.

The last point introduces, for the supplier of irrigation services, the issue of coping efficiently with the varying risk preferences or degrees of vulnerability of its clients in the face of seasonal fluctuations in water supply. An effective way for a food exporter to avoid high costs associated with particular seasonal conditions, a drought for example, would be to buy options over the water rights of a grower facing smaller losses from lack of water. A rice grower, for example, may find it profitable to sell such an option and risk crop failure, perhaps one year in ten, or even to plant a less water-intensive crop when water levels in upstream reservoirs are relatively low. An options market in water rights, in addition to the primary market in those rights, would add to the efficiency with which water resources are used. Further research would be required to investigate the appropriate mechanism, costs and benefits of such a market.

**Dietary change**

*Trends in Western society*

Since it was argued above that Asian eating habits are influenced by those in the West, it is worth investigating current trends in Western food consumption. Two trends have been observed in Western eating habits in recent years. They are the trend towards convenience and ‘fast food’ on the one hand, and towards health foods, or at least heightened nutritional consciousness, on the other. From a nutritional perspective, these two trends are usually viewed as opposites and yet they are frequently observable even within the same family.
There are two rational explanations for the prevalence of processed food in general:

- the processor is able to capture economies of scale in food preparation that are not available within the home; and
- since much of the work in food processing requires a relatively low skill level, processing is a means of transferring the work to people whose time has a lower opportunity cost.

The trend towards the demand for processed food is likely to persist. However, high degrees of processing may not be consistent with consumers’ interests in eating healthier food. Consumers may have to trade off their set of desirable features of healthy food for convenience. Considerable effort in the food industry is now being made to relax this constraint.

New production and logistic technology is increasing the availability of pre-prepared fresh food. That is, to some extent the consumers’ dilemma is being solved by a convergence of the two trends. Examples include the following:

- meal-sized packs of mixed, pre-prepared fresh vegetables are being sold in supermarkets such as Woolworths and Franklins. This has been an important aspect of Woolworths ‘fresh food’ strategy (Shoebridge 1994);
- the Melbourne based company, Salad Fresh, has been selling ready-to-eat salads in cellophane ‘pillow packs’ through Woolworths supermarkets in Victoria for twelve months (Shoebridge 1994, p. 44);
- chilled fresh meals now account for 65 per cent of prepared meal sales in Marks & Spencer (UK) stores, with frozen products making up the balance; and
- variety and freshness of pre-prepared salads is used as a major selling point in some fast food chains in France and Italy.

It is argued here that the trend towards fresh food is more than a temporary phenomenon. The critical change in the way fresh food is consumed is the greater emphasis on time efficiency in its purchase and preparation. However, an interest in subcontracting the preparation of fresh food to others raises some new concerns among consumers about quality control. Taylor (1994, ch. 2) argues that the use of brand names and retailer reputations as a quality control signal is a rational means of reducing the search costs of consumers. He argues that this phenomenon is crucial in explaining the pronounced trend towards vertical integration of the logistic chain in the fresh food industry.
Food consumption trends in East Asia

The trends towards convenience and health can also be anticipated in the growing economies of East Asia. Certainly, the changing retail trends quoted above can be understood as evidence of greater emphasis on time (and cost) efficiencies in food purchase.

One general conclusion of the recent research into dietary change in Asia⁵ is that most commercial and economic assessments overstate the degree of Westernisation of Asian diets. Worsley points to a significant number of surveys that have produced ‘league tables’ of factors that are important in food choice.⁶ While these vary significantly across income and cultural groups, cost and taste tend to be ranked at the top with nutrition and then convenience close behind. Factors that might indicate a preference for Western food do not generally rank highly in the Asian surveys.

Vinning argues that both convenience and healthiness are important in East Asian food choice but that does not equal Westernisation (1993, ch. 2). He proposes an ‘asymptotic hypothesis’, that Westernisation of the Asian diet will slow down as income increases. Vinning believes that rice and vegetables will continue to dominate the diet and that condiments, fermented products and various fish-based sauces will also continue to be central (1993, p. 20).

Vinning refers to trend estimates in the 1970s and early 1980s which extrapolated, into long-term trends, dietary changes apparent in Japan at that time. These estimates have not been accurate, he argues, because they ignored the view, widely held by Japanese (and more than a few Westerners), that their diet is nutritionally superior to that of most Western developed countries (1993, p. 15). Moreover, he quotes a survey which indicates that fresh products will be the major beneficiary of change in the Japanese diet. The survey of households around Tokyo rated vegetables, fish and fruit as the three product groups of which they would most like to increase their consumption (1993, p. 16).

Wahlqvist conducted a survey of food choices in thirteen Chinese communities around the world.⁷ The evidence suggests that the choices are made on the basis of a complex combination of factors, including the ‘league table’ of objective factors mentioned above, traditional values, pro-Western preferences and marketing pressure. Thus, while there is a significant migration from green tea to Coca Cola, the traditions in food preparation are much more resilient. Worsley points out that where Western scientific research supports traditional beliefs and where Western products are adapted to those beliefs, marketing campaigns have been successful.⁸ He quotes the example of water chestnut flavoured mineral water selling well in Japan because science has validated the traditional belief in the healthy properties of water chestnuts.
Retailing trends in Asia

Wahlqvist reports that estimates of the introduction of supermarkets into Southeast Asia have generally been too high, while increases in per capita income have led to expansion of the traditional wet-market system — that is, markets for fresh fruit, vegetables and animal products. This finding supports Vinning’s views on the resilience of East Asian food habits.

On the other hand, there is evidence that Taiwan is following McKinsey’s ‘S-curve’ mentioned above. The percentage of Taiwanese who bought groceries in modern shops grew from 3 per cent in 1987 to over 50 per cent in 1994 (The Economist, 1995, p. S14). However, evidence of rapid change is confined to highly urbanised areas and it is likely that degree of urbanisation explains the discrepancy. Figure 1 shows the pattern of urbanisation in the region and highlights the extent to which Hong Kong and Singapore, where change is also rapid, are outliers compared to other economies. Extrapolating the experience of such highly urbanised economies to the rest of the region could be misleading.

Figure 1 Urban shares of population

**McKinsey vs Vinning models**

The similarities between the McKinsey model and what we shall refer to here as the Vinning model are that both emphasise the need for extensive market research into the food preferences of particular cultures within East Asia as a prerequisite to successful export by Australian companies. Since this process effectively requires strong vertical linkages between producer and marketer, both models imply that increased vertical integration is a priority if Australian export performance is to be improved.

The differences are perhaps more a question of emphasis than fact, but they do result in different strategic implications. The McKinsey school emphasises the trend towards Westernisation of diet and retail channels, which results in a focus on the market for processed foods and the corporate (vertically integrated MNE) strategy for gaining access to those markets. Many proponents of this view assert that ‘the key to Australia’s success in food exports is in adding more value (by processing)’ (O’Flahertie 1994, p. 55).

The Vinning school, by contrast, emphasises the resilience of traditional dietary preferences, particularly those for fresh produce, and retailing systems, such as the wet markets. Some exporters accept the importance of the fresh food market, but are targeting more affluent consumers through modern retail outlets. These outlets normally have the additional advantage of refrigerated storage and air-conditioning in the display area.

Acton argues that Australia should seek to be ‘Asia’s favourite farm’ (rather than its food processor) since:

- adding value (in the form of processing) often subjects the product to higher tariffs;
- a high percentage of the work in food processing has a low skill requirement, with Australia having a significant labour cost disadvantage *vis-à-vis* its target countries; and
- fresh produce is often valued for the fact that it comes fresh from an exotic source — for example, the premium attracted by fresh Canadian salmon (O’Flahertie 1994, p. 55).

However, evidence reported below challenges the view that fresh (as opposed to raw) produce will not be subject to protection. Handling fresh material can also be relatively labour intensive.

The scope for exporting fresh produce to Asia, however, might be at least as important as that for processed food. If so, there are important implications for the organisation of export
vertical integration is important in fresh produce export because of the need for strict quality control along the entire logistic chain. One option is more corporate involvement in fresh food export but there are viable alternatives. Those alternatives are also discussed below following a review of Australia’s competitiveness in fresh food markets.

Australia — ‘The fresh food people’?

Competitiveness of Australian producers

Environmental issues

Green movements around the world have focused public attention on two issues relevant to the food industry: the wholesomeness, or ‘cleanliness’, of the product; and the impact on ecological sustainability of the production process, or greenness. The degree to which food is regarded as wholesome depends on its nutritional value and the presence of trace substances deleterious to health. Green movements have also promoted consumer power as an effective means of achieving more ecologically sensitive agriculture. Knowledge that the food product under consideration has been produced in an environmentally friendly way is argued to be valuable for most consumers.

A ‘Clean and Green Australian Food’ campaign was initiated in Taipei in May 1994. The campaign seeks to capitalise on the common overseas perception of Australia as a clean and green food source. Since the campaign will obviously focus attention on the accuracy of that perception, it is worth asking whether Australia can achieve the clean and green characteristics at lower opportunity cost than other suppliers. However, since no economic analysis of this issue has yet been published, this paper simply flags the main issues.

Nuclear contamination

Being ‘Chernobyl free’ is commonly believed to be a significant factor in Western European markets. For example, Hassall & Associates (1990, p. 68) refer to the food scares that followed the Chernobyl accident. However, minor leakages of radioactive material concern many people and may become a significant influence on consumer choices in Asia.
Industrial wastes

Since there is very little industrial activity in the Murray–Darling Basin, the region has an advantage in this respect as well. The NSW Department of Water Resources initiated pilot studies of trace metal contamination in 1991 and we understand that preliminary results support that assumption (NSW Department of Water Resources, 1994, pp. i–2.) Acid rain has a deleterious effect on agriculture in parts of Europe, North America and Asia but not Australia.

Agricultural wastes

Agricultural wastes have become an important issue for consumers in OECD countries and will become a significant issue in Southeast Asia. An example of the importance of purity to the OECD markets is provided by an incident involving Perrier mineral water in February 1990. Minute traces of benzene were detected during independent tests. As part of their ensuing crisis management, Perrier recalled all bottled water worldwide and ceased production until the source of contamination had been found (in a filter used to purify carbon dioxide). By May 1990, the company had regained 17 per cent of the world market, which was less than half its pre-scare 36 per cent (Butler 1990, pp. 72–3).

Closer to home, the Australian company, Koala Springs International, had a similar benzene contamination of its blended mineral water and fruit drink. Learning from the Perrier experience, the company immediately recalled all its products and ceased production until the cause was traced (Schoeny 1991–92, pp. 25–6). In Japan, where market establishment had been successful, the company apparently had to withdraw from the market completely. While mineral waters may be an extreme example, since the claim to purity is central to the marketing strategy, they do demonstrate the significance of the contamination problem where ‘cleanness’ is a selling point.

While most Australian food production, particularly that in the Murray–Darling Basin, is relatively safe from industrial pollutants, agricultural wastes are a concern. The Australian Geological Survey Organisation (AGSO) has found contamination by pesticides, fertiliser and bacteria in the groundwater underlying major irrigation areas. It reported that ‘although the levels of most of the contamination are below the safety limits set by the National Health and Medical Research Council, the contamination is widespread in those Murray Basin aquifers that have been studied so far by the AGSO’ (Australian Institute of Agricultural Science 1993, p. 12).
The NSW Department of Water Resources technical report on pesticides details similar problems in the rivers of the Murray–Darling Basin (NSW Department of Water Resources 1994). While concentrations are usually below drinking water guidelines, pesticide concentrations have exceeded those guidelines during storms (NSW Department of Water Resources 1993a). Since cotton production is a major source of pesticide contamination (NSW Department of Water Resources 1993b, p. i), its compatibility with the production of ‘clean and green’ food within the same river basin is a topic for further research.12

If the knowledge that the food consumed was produced in an environmentally friendly way is a positive attribute to the consumer, then that feature can become a theme of marketing campaigns. However, there is also a risk.13 The ecological problems created by agriculture in the Murray–Darling Basin are well known. Clean Food Australia is aware of its vulnerability in the light of these issues and has avoided claims that cannot be substantiated.14 However, product promotion often depends on images and, judging by the Perrier and Koala Springs experiences, those of salt-devastated countryside, algal blooms and hyacinth-clogged waterways could undermine Australia’s food marketing efforts.

Water-borne disease

Throughout much of Asia and Latin America, it is inadvisable to eat uncooked vegetables because of the presence of water-borne disease bacteria (Pullar and Cadman 1993). This represents a significant potential advantage to Australian producers in the Asian fresh vegetable markets.

Factor endowments

It has often been claimed that Australia’s abundant natural resources give it a significant comparative advantage in intensively-produced food, as well as in its traditional markets for extensively-produced cereals and meat. In this context, intensive food production includes land-based aquaculture, game meat production (such as deer, emu, ostrich and pheasant) and horticulture. Since horticulture constitutes the vast majority of the production of this group, the ensuing discussion focuses on it. However, many of the issues raised, especially those associated with fresh food logistics, apply equally to the other products.

How abundant are Australia’s agricultural resources? Few people would question the surfeit of prime horticultural land located in a wide variety of suitable climatic zones. Much of this land is within reasonable distance of major markets, ports and airports. The image of
Australia as a dry continent raises the issue of its limiting natural resource — water. To what extent does that limit Australia’s capacity to respond to the expected increase in East Asian demand for food imports? The following sections discuss the scope to raise the productivity of water use in Australia but also note some offsetting disadvantages of Australian-based producers.

Water

The available water resources can be used more productively in Australia in a variety of ways:

- The shift to intensive production involves greater capital investment per hectare and this generates efficiencies in water use. In particular, it enables the use of new water efficient technologies such as drippers and hydroponics, but glass-houses and poly-houses also help by reducing evapo-transpiration losses.

- The mechanisms for allocating water rights have not been market based and this has led to inefficient allocation between crops and inefficient methods of distribution and application of water. These inefficiencies incur other costs in the form of rising water tables and consequent land degradation. River system rehabilitation programs are now being undertaken by member states in the Murray–Darling Basin Commission. The programs include free trading in water rights and removal of subsidies for water use, which should increase the efficiency in use of the scarce water resource substantially (Hall, Poulter and Curtotti 1994, p. 33). It is worth noting, however, that the recent increase in water charges imposed by the Carr government in NSW is levied on the basis of entitlement not use, and it is arguable that, in the absence of a liquid market for short-term allocations, the effect of this will be retrogressive. Arguments in favour of a more liquid and more sophisticated market in water rights were noted above.

- In some regions, the irrigation capacity is underutilised. For example, Deer and Lewis (1988) estimate that the lower south-east of South Australia could support an additional 70,000 hectares of irrigation. There is additional unused potential in the same underground water basin across the border in the western districts of Victoria.

- Much existing irrigation water is applied to crops and pastures whose gross product per unit of water is only a fraction of that from horticulture. Some of this is caused by inefficient allocation of water rights, but probably much more important is the low profitability of Australian horticulture generally (a national average of 0.3 per cent
a year for the eight years to fiscal 1987 (Industries Assistance Commission 1988, p. 11.9). As horticulture becomes more profitable, it can be expected to bid water away from less productive uses.

While regulatory impediments to trade in water rights are gradually being removed, other problems remain. The quality of the infrastructure used to distribute irrigation water is a case in point. Much of the channel network was established at least fifty years ago and was designed to service smaller farms. Being wasteful of water, compared with modern, pipe-reticulation systems, it contributes to the problem of rising water tables. Moreover, the layout and the irrigation-trust ownership structure of some networks inhibit changes in management and ownership of the land being irrigated. From an economic perspective, the problem is essentially one of setting up mechanisms for accumulating the contributions of irrigators to infrastructure replacement, while providing them with a more liquid asset. A free market in water entitlements, based on the principle of full cost recovery by the provider of irrigation services, can be expected to contribute towards solving these problems.

Seasonal niches

Most export markets for fresh produce are for products that are unavailable locally, either because of seasonal or climatic limitations. Many existing markets for Australian produce are niches in northern hemisphere off-seasons, in tropical countries for cold-climate products and vice versa. The relevant points here are that Australia’s climatic diversity and southern location give it comparative advantages in numerous northern hemisphere markets and that its main competitors are New Zealand, temperate South America and South Africa.

Labour

Australia possesses a high level of skills in agriculture and its support services. Additionally, ‘Australian based companies possess product and process technologies and skills in consumer marketing, trade marketing and channel management that are the equal of many regional competitors’ (White 1994, p. 29). However, many food production processes are relatively labour intensive and Australia suffers significant cost disadvantages with respect to its major competitors. In an international benchmarking study conducted by Edgell Birds Eye Ltd and part-funded by the Horticultural R&D Corporation (HRDC), the growing costs for eight selected vegetables were found to be on average 53 per cent higher in Australia than in New Zealand (Industries Commission 1993, pp. 333–5).
A comparison of the costs of production and export of pears in Australia with those of Chile found that 92 per cent of the overall cost difference is attributed to manual labour (Pullar and Cadman 1993, p. App.1). It is also interesting to note that, for the pre-processing costs for pears — that is, the costs equivalent to those measured in the Edgell Birds Eye study — Chilean costs represent 31 per cent of those in Australia.

Production support and logistic services

Production support services in Australia are generally believed to be internationally competitive in quality and price, with the qualification that in many OECD countries, research, development and market information services are heavily subsidised.

Freight and waterfront handling are the weakest link in the food export chain from Australia. For example, ‘freight plus handling costs from the US and New Zealand to Japan and Singapore are ... about two-thirds of those from Tasmania to the same destinations’ (Industries Commission 1993, p. 124). Of additional importance to fresh food exporters are the reliability and ship turnaround times, in which Australian performance, although improved, is still below that of its main competitors (Industries Commission 1993, p. 125).

The rapidly growing tourist traffic between Australia and Asia offers a significant advantage to Australian food exporters. As well as demonstrating the relatively clean and ‘green’ environment (which tends to be selectively chosen for tourist destinations), it provides freight capacity on otherwise less-than-fully-loaded aircraft. This capacity is generally available to horticultural exporters at discounted freight rates (Industries Commission 1993, pp. 127–30).

Taylor (1994) describes new technology that is presently being commercialised and can extend the storage life of fresh fruit and vegetables between twofold and fourfold. He argues that this technology will have a major impact on export of fresh produce. These innovations can be expected to provide Australian (and New Zealand) exporters with a temporary competitive advantage before being adopted in other countries. Other innovations, such as genetically engineered varieties with longer storage life, will also be important. Australian researchers have developed some such varieties but do not have an overall advantage in this field.

Recent improvements in information and communication technology have also been important in facilitating the demanding logistical requirements of fresh food export. However, the benefit from these improvements can best be exploited in very large-scale export operations. For this reason, Australia’s exporters suffer a competitive disadvantage vis-à-vis many of its
competitors, especially the large MNEs, statutory marketing authorities (SMAs) and cooperatives. One innovation that might allow smaller firms to capture some the scale economies offered by that technology is an electronic market for fresh food. This possibility is outlined below.

**Challenges**

**Protection**

One challenge to the growth of Australia’s penetration of food markets, including those for fresh food, will be policy responses to the structural change occurring in East Asia.

There are severe constraints on the capacity of the East Asian economies to meet the growth in food demand. These constraints are related to their endowments of labour relative to land and to the alternative uses of land and labour that emerge during rapid growth in that setting (Anderson 1987). There is a decline in the importance of agriculture over time, a transformation which is common and much more rapid in economies that are relatively densely settled. Labour is diverted into higher productivity uses and, in the process, agricultural production tends to become more capital and technology intensive. The extent of the use of purchased inputs also rises. All these changes create business opportunities for agricultural producers in economies where these changes have already occurred.

The agricultural sector’s decline in relative importance is also consistent with the rapid decline in net exports of food and agricultural products over time. The decline in the agricultural sector is associated with the growth in urban communities, illustrated above. The development of urban settlements also implies the diversion of land into other uses. Not only labour but also land may be diverted to other uses, an adjustment which reinforces the relative decline in agriculture’s share of output.

A major issue in this process of structural change are policy responses. In the early stages of development, the agricultural sector tends to be taxed compared to the rest of the economy (Anderson 1994). One of the motivations is to maintain the supply of relatively low cost food to the urban industrialised workforce, for whom food remains an important part of the household budget. As development proceeds, and as incomes rise and the agricultural sector declines, fundamental political changes take place. The importance of food in urban budgets declines and, with it, the sensitivity of urban consumers to price rises. Also, the smaller agricultural sector
becomes a relatively more easily organised and more influential political force. Add to this a national sensitivity about reliance on imported food and the scene is set for a switch in policy. Agriculture tends to become subsidised, or protected, relative to the rest of the economy.

In the absence of the protectionist policy response in importing countries, the preferred strategy for food exporters may be to sell products from home. The increase in support for agriculture, however, redirects attention to other methods for earning a return on investments in accumulated skill and experience in agricultural production. Options include becoming involved in technology transfer and foreign investments in agriculture in rapidly growing economies.

The impact of agricultural protection was also stressed in the recent report from the East Asian Analytical Unit (EAAU) of the Australian Department of Foreign Affairs and Trade on food markets in Southeast Asia. This report notes that ‘common targets for import protection by most ASEAN countries in recent years have been meat, milk and cream, and vegetables and fruit, in which they are seeking to displace imports, become self sufficient and develop export capacity’ (East Asian Analytical Unit 1994, p. 249). A common pattern in protection in this sector is one of low rates for unprocessed products (such as grain or raw wool) with rates rising with the degree of processing. The EAAU notes, however, that often the rates of protection against imports of fresh fruit and vegetables are also relatively high.

The outcome of the Uruguay Round will lead to reductions in support for agriculture in these economies. It binds and then lowers tariff rates, replaces non-tariff measures by tariff equivalents, and relaxes import bans over the implementation period. However, the targets in that outcome refer to averages for the whole agricultural sector. The details of how that target will be achieved are not yet known. As the EAAU points out, Australia will have to become involved in bilateral negotiations to clarify how market access will be affected for commodities of particular interest. The EAAU also notes the importance of APEC in this context.

**Quality control**

A second major challenge to Australian export success will be solving problems of quality control, the importance of which was noted above.

Casson (1987, ch. 4) describes two mechanisms of quality control: mass monitoring and relationship contracting. He argues that the choice between these mechanisms is a major determinant of organisational form in any production and distribution system. The presence of scale economies in monitoring production-line work is one of the factors in the success of mass
production. However, some production processes are not amenable to mass monitoring and, in those cases, relationship contracting has proven to be the best alternative. Agricultural production is one such case, since workers tend to be too widely dispersed for economical mass monitoring. This is one factor in the widespread success of the family farm. Food processing, on the other hand, is very largely done in factories where mass monitoring is efficient.

The quality control issue is therefore a major explanator of the difference between organisational forms common in the growing and processing phases of food production. It also implies that the best organisational forms for export of processed and fresh food may not be the same. The literature includes little dispute that the appropriate organisational structure for the manufacture and export of processed food products is the large MNE with certain critical processes linked by vertical integration. However, as mentioned above, quality control, and therefore a form of vertical integration, is also critical to successful food exports.

Taylor (1994, p. 24) points out that some quality parameters in the fresh food business, such as longevity, are not usually observable at time of purchase, but attain much greater significance for export than for domestic distribution. Similarly, the quality of logistic services is difficult to monitor. This explains the prevalence of relationship contracting in successful horticultural export operations (Taylor 1994, ch.3).

Taylor compares three organisational forms that have proven successful in horticultural export: the vertically-integrated MNE, the SMA, and the small non-ownership integrated firm. The first of these includes firms such as Chiquita, Dole and Del Monte but, increasingly, US and European supermarket chains buying direct from foreign growers.

Taylor concludes that the keys to export success are effective quality control and the ability to capture economies of scale and scope in international marketing. All three forms use relationship contracting to some extent to solve quality control problems, but the MNE and SMA have significant scale advantages. However, ACIL (1992, ch.7) argues that the SMA, because of its ownership characteristics, impedes the efficient allocation of incentives along the logistic chain. As new technology and increased competition in international markets raise the quality expectations of consumers, this is expected to become a more serious problem. Accordingly, ACIL recommends that SMAs be transformed into corporate structures so that they become more responsive to market signals.

This argument explains the dominant position of MNEs in international horticultural trade and lends support to the relevance of the McKinsey model to this activity. However, in many niche markets where scale is not as important, smaller firms may be successful.
Australian horticulture will gain from keeping its marketing options open and not being restricted to one model which stresses corporate involvement. Innovative forms of organisation are worth exploring. These include:

- An electronic market for fresh food (see below).
- Three-tier joint-venture clusters, in which growers form a producer cluster, typically focused on one packing shed, and a number of producer clusters form a marketing cluster. This model has been adopted successfully by some US producers, using a cooperative structure at each cluster level.
- Use of multinational freight firms. A key element of competitiveness, as indicated by import market penetration, will be the availability of trading services which lower the extent of sunk costs borne by the relatively small exporters in this industry. Because of the scale economies in international logistics, multinational freight firms such as DHL, UPS, TNT and Mayne Nickless now offer integrated logistic, trading and even downstream production services to manufacturers and see them to be a major growth area (Forman 1994, pp. 84-6). Fresh food exporters may become an even greater source of that growth.

**An electronic market for fresh food?**

Recently, Woolworths Ltd has been involved in establishing GEMMnet, an electronic merchandising facility, where it publishes details of some lines required. The service is being marketed to other retailers. Simultaneously, Woolworths Ltd has encouraged all of its suppliers, of manufactured goods and fresh produce alike, to list details of products available. This is valuable for buyers and sellers who have established credentials with one another. However, in principle, it would be possible to provide an electronic market on which local and international contracts for fresh food could be settled. Such a market would have to perform the following functions:

- provide all relevant data necessary for sale of produce by description (including, for example, quantity, harvest date, feasible destinations and arrival dates, objective measurements of average size, weight, sugar content, firmness and colour and subjective assessments of taste, texture, flavour and ‘bloom’), and sellers’ details including graphic image of logo;
- provide auction and open bid-offer facilities for spot and forward sales;
guarantee settlement of contracts, including delivery of produce as specified and payment for it; and

- provide quality assessment and certification of logistic services and specify logistic procedures, including post-harvest treatment and in-transit storage technology.

Taylor (1994) examines these features and some problems that might be anticipated in such a market, such as perishability of the produce and the incentive for both sellers and buyers to cheat. He argues that the technology for solving those problems already exists and that the system would be able to capture many of the available economies of scale and scope in international marketing and pass them on to smaller producers and retailers. This, in turn, should be reflected in better returns to producers and, in making smaller retailers more competitive, better prices and wider choices for customers.

**Summary**

What is the ‘bottom line’ of this review of the determinants of Australian competitiveness? Is it necessarily the case that Australia is a competitive exporter of food in some value added form?

Sources of competitiveness include land, climate, water, and proximity to Asia. These and its southern hemisphere location avail it of seasonal niches in northern markets. The ‘clean and green’ image available to its exporters is also an asset. However, it is an asset vulnerable to abuse, and the coordinated national campaign to exploit it faces the same free-rider problems as other common-property resources.

The East Asian market for imported food will continue to grow. Fresh and processed foods will both be important and Australia has considerable potential to exploit both markets. However, despite recent deregulation, it still faces major structural impediments. The scope for one of the driest continents to be an exporter of irrigated agricultural products highlights the importance of establishing institutional arrangements that lead to the most efficient uses of the water available and the rejuvenation of the water distribution infrastructure.

Perhaps the most important structural aspect of the export business is the organisational form of the industry and its component enterprises. This is vital to the capture of scale economies and to effective quality control, but it is the aspect in which Australia suffers its greatest disadvantage relative to its competitors. The absence of appropriate forms of organising export business may be the major disadvantage of Australian horticulture. Its absence could be the result of an interplay between certain geographic, cultural and political aspects of the
development of Australian agriculture. Although many of the regulatory impediments have recently been removed, some are still present, and significant structural inertia remains. Clearly, to assist in the selection of appropriate organisational forms, further research is required into the relative merits of alternative forms and into the remaining obstacles to their adoption. The differences between organisational forms common in the growing and processing phases of food production can be traced to quality control issues. The best organisational forms for export of processed compared to fresh food may not be the same. The literature includes little dispute about the appropriate organisational structure for the manufacture and export of processed food products. But in fresh food markets there are a number of options. Australian horticulture will gain from not being restricted to just the one model stressing corporate involvement.
Notes

* Parts of this paper were presented at the Ministerial Water Forum hosted by the Department of Water Resources in Sydney in September 1994. Our thanks go to A. S. Watson for discussion of the topic of this paper. Errors of fact and interpretation are ours. Philip Taylor is Senior Economist for the wine and citrus industries with the Planning and Industry Development Group of Primary Industries, South Australia; Christopher Findlay is an Associate of the Australia–Japan Research Centre at the Australian National University.


2 Telephone interview in October 1994 with Dr M. L. Wahlqvist, Professor of Medicine, Monash University, regarding a forthcoming research publication.

3 Uncle Tobys was, in fact, sold to Goodman Fielder in 1994. Its ultimate owner at the time, Doug Shears, is understood to have sold precisely for that reason (Gottliebsen 1994, p. 27). Arnotts has also been taken over by the US multinational, Campbell Soups.

4 See Taylor (1994) for a more detailed discussion of the origins of success by different types of exporters.

5 See, for example, Vinning (1993), East Asian Analytical Unit (1994), and telephone interviews with Dr M. L. Wahlqvist (see note 2) and Dr A. Worsley (see note 6).

6 Telephone interview in October 1994 with Dr A. Worsley, a research scientist with the Division of Human Nutrition, CSIRO, Adelaide, regarding a forthcoming research publication.

7 Telephone interview in October 1994 with Dr M. L. Wahlqvist, Professor of Medicine, Monash University, regarding a forthcoming research publication.

8 Telephone interview in October 1994 with Dr A. Worsley, a research scientist with the Division of Human Nutrition, CSIRO, Adelaide, regarding a forthcoming research publication.

9 Telephone interview in October 1994 with Dr M. L. Wahlqvist, Professor of Medicine, Monash University, regarding a forthcoming research publication.

10 Doug Shears, owner of the agribusiness company, ICM, for example, argues the case for the growth potential in fresh food exports (Gottliebsen 1994, p. 27). He has backed
this belief with an announcement to purchase 35 per cent of Australia’s largest fresh fruit and vegetable exporter, the Sumich Group, and emphasises the potential for fresh, ready-to-cook meals, especially those packaged for one person (Shoebridge 1994, p. 40).

11 Telephone interview in August 1994 with Dr G. Bell, a research scientist in the Food Science and Technology Division of the CSIRO, Sydney.

12 In this context, we note the significance of the CSIRO’s recent development, by genetic engineering, of a cotton cultivar that produces its own pesticide (Peacock 1994).

13 In a recent discussion, Bob Bothwell, Senior Vice President of Pepsico Inc., applauded this initiative and said that such a risk should never be taken as a reason not to go ahead.

14 Telephone interview in August 1994 with Mr P. Morris, Director of Clean Food Marketing Australia Ltd and of the Agribusiness Policy Section of the Commonwealth Department of Primary Industries and Energy.
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