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Australian Barley Prospects in China's Growing Brewery Industry [1]

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Exhibit 15. Forecasts for the barley industry.

Abstract

Australian barley production has varied between 3 and 7 million tonnes over the 10 years to 1997 and, despite seasonal fluctuations, has been slowly increasing over that period. Most Australian barley is produced in the states of South Australia and Western Australia with significant quantities produced in New South Wales and Victoria. Approximately one third of barley produced is sold as malting barley. Of this the majority is exported with Australian exports comprising over half the world trade in malting barley of about 1.8 million tonnes.

Available records indicate that China imports about half Australia's total exports of malting barley and is thus Australia's major market. Increasing demand for malting barley in China due to increasing demand for beer indicates a potential market of about 1 to 1.5 million tonnes of malting barley imports. Australia has renewed its efforts in plant breeding, quality control and industry deregulation in order to improve quality and ensure its future competitiveness in world malting barley markets. Growth in production of malting barley in Australia, which could help satisfy Chinese demand, will depend mainly on these initiatives as well as the world price being attractive enough compared with its main competitor for cropping land in Australia being wheat.

Introduction.

Australia is a major supplier of the world's internationally traded barley for stock feed, the brewing industry and other food processing. In 1996/97 Australia accounted for 53% of the world's export trade in malting barley. Australia's largest customer for malting barley is China, with other major customers being Japan, Korea, Taiwan, South America and Mexico.

Australia's position in the market has eroded in recent years. Although Australia has maintained or slightly increased its volume of barley exports its market share has deteriorated, i.e. increased demand for Australia's product has not matched the increase for its competitors' product. This occurred because Australia has been slow to react to the growing sophistication of the world's brewing industry and to keep in touch with customers' needs.

This situation has been recognised and the Australian industry has become more 'market driven'. All organisations involved in the Australian barley industry have begun to collaborate with the aim of establishing Australia as the world's premier supplier of high quality barley.

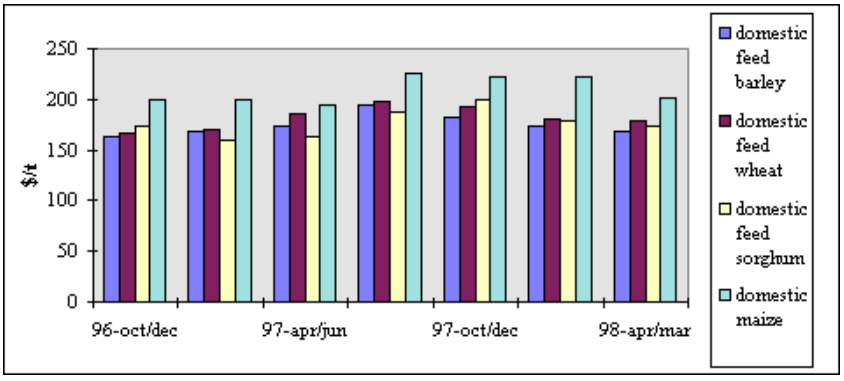
This paper outlines the Australian malting barley industry in terms of the present situation, recent history and trends and expectations.

Production / Output.

In the period 1988-1997 Australia's total barley production fluctuated between 3 and 7 million tonnes. The fluctuation in production between seasons is caused mainly by climatic conditions or price attractiveness to growers. As the barley market is a commodity market, the main determinant of price is the supply of competitive products (varying from season to season), and the conditions of related industries that may use barley or a cheaper substitute such as corn and the human consumption patterns that affect these related industries. Due to these determinants the total barley market has highly volatile forces of supply and demand.

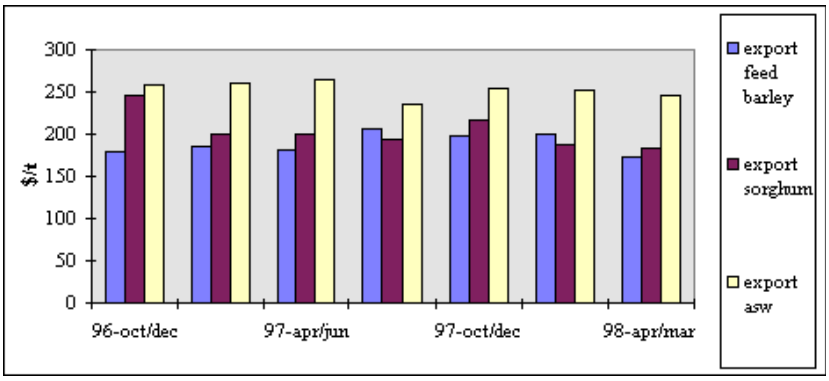
Being a commodity market, the margins made by the grower have no impact on price, they do not matter to the buyers, only to the growers and their decision of whether to produce barley or a more profitable alternative. Barley's main competitor in this sense is wheat, which has similar production costs and, on average a higher price per tonne. The trend of higher returns for wheat than for barley is true even of malting barley, which, although it receives a premium, is still below the prices received for Australian Standard White grade wheat. Other main competitors of sorghum and maize also receive, on average, higher returns than barley, although they are much closer in price to barley, as shown by Exhibits **1**, **2** and **3**, below.

Exhibit 1. Price comparison of barley's domestic competitors.



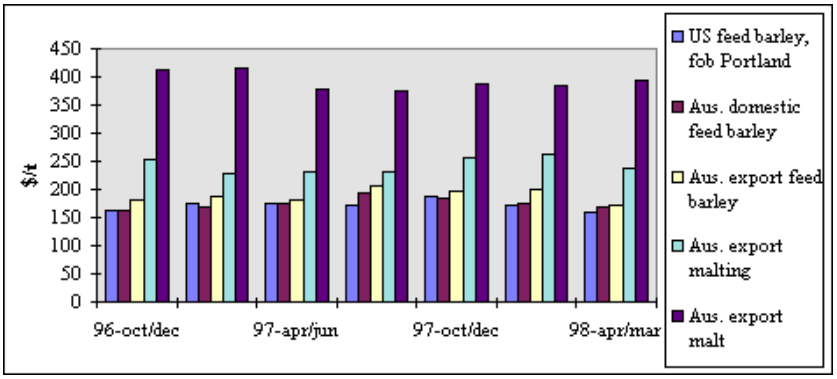
Source: ABARE, Australian Crop Report, June 1998.

Exhibit 2. Price comparison of exports.



Source: ABARE, Australian Crop Report, June 1998.

Exhibit 3. Prices of barley grades, as compared to US no.2



Source: ABARE, Australian Crop Report, June 1998.

Below can be seen comparative gross margins of wheat, barley, triticale, oats and rye. Please note that these are figures from the Mallee region of North-western Victoria and, as such, are only a guide to comparative costs and returns.

Exhibit 4. Comparative gross margins.

	Wheat (ASW)	Wheat (Hard)	Barley (Malting)	Barley (Feed)	Triticale	Oats (Milling)	Rye corn
Preparation P[1]	4P	4P	4P	4P	4P	2P	2P
Yield range	0.7-3.5	0.7-3.5	0.7-3.5	0.7-3.5	0.7-3.5	0.5-3.5	0.5-3.5
Avg yield (t/h)	1.8	1.8	2.0	2.0	1.8	1.8	1.0
Farm price ($/t)	146	178	176	138	134	131	200
Gross income:	263	320	352	276	241	236	200
Variable costs ($/h)	11	11	11	11	11	9	7
Fuel	10	10	10	10	10	11	21

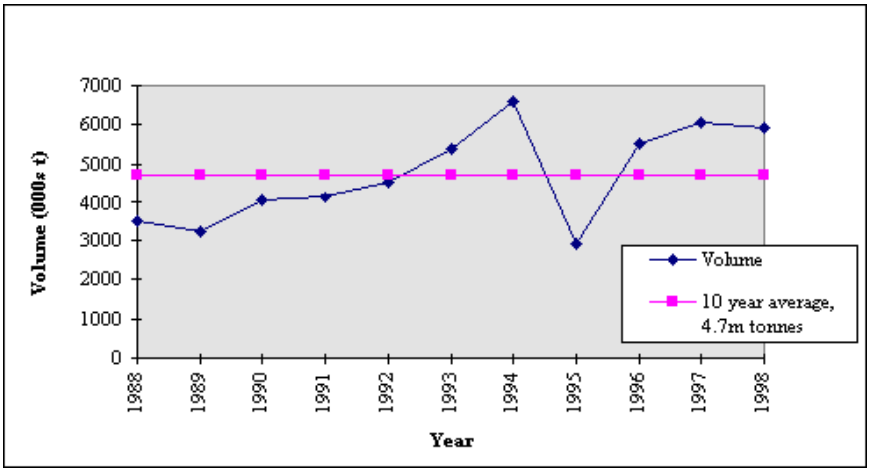
R&M	39	39	39	39	39	39	39
Seed	11	12	13	12	20	11	21
Fertiliser	39	39	39	39	39	39	39
Herbicides	17	17	17	17	17	11	11
Insurance	3	4	4	3	3	2	2
Harvest	8	8	8	8	8	8	8
Total V.Costs	99	101	102	100	108	89	95
GM (4/h)	247	219	250	176	13	147	105
Break even yield (t/h)	0.68	0.57	0.58	0.72	0.87	0.68	0.51

Source: Australian Barley Board, 1998.

A realistic decision to produce barley is mainly based on a comparison of barley's costs and returns relative to a 'competitor' crop, however, the farm's position on the farm crop rotation cycle is also of relevance. Barley is appropriate in this sense when the nitrogen levels in the soil are low.

In recent years the area sown to barley has trended upward, excluding 1995, when the area sown fell, due to severe drought conditions. At 6809 Kt in 1997, production has reached a level significantly higher than in the 1980's. The reasons for this have been, a reduction in sheep production, improved barley prices (relative to other grains) and the rapid expansion of both malt and feed barley markets. Drought conditions in Australia's northern states from 1992-1994 created a favourable marketing environment for growers in the southern states. The growth in Australia's feedlotting industry has also increased domestic demand for feed barley. Exhibit 5 shows production fluctuations since 1988.

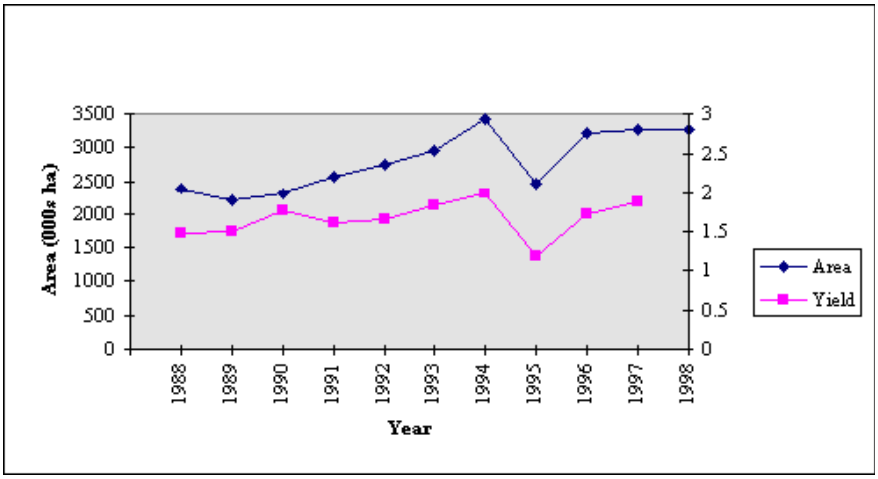
Exhibit 5. Australian Barley Production.



Source: Australian Barley Board, 1998.

The area sown to barley and the resulting yields since 1988 are displayed below.

Exhibit 6. Area planted to Barley and yield/ha.

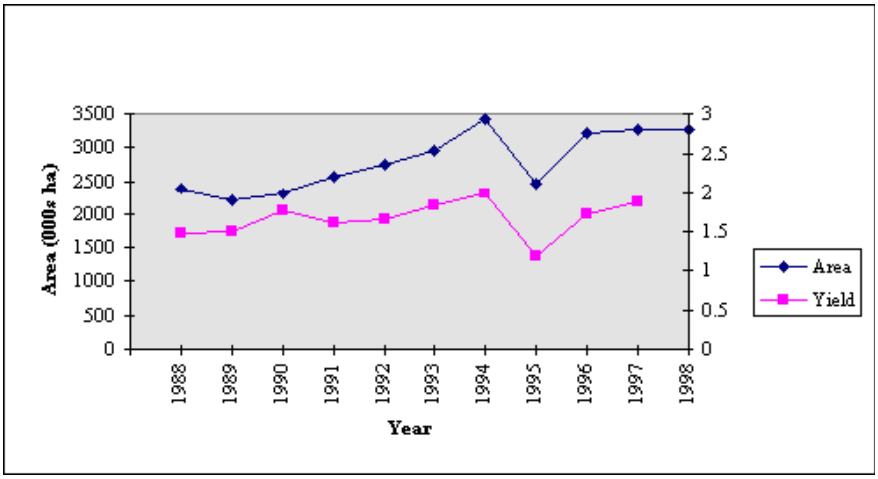


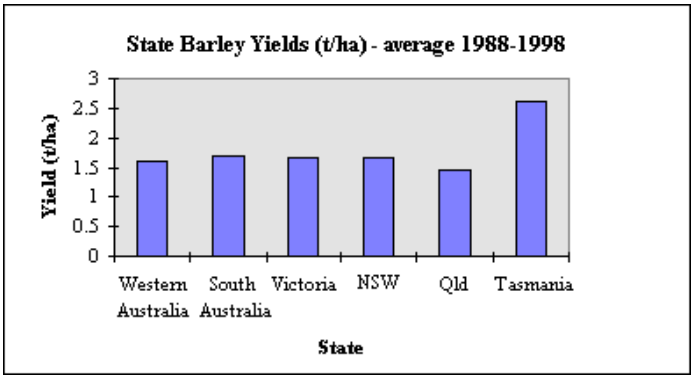
Source: Australian Barley Board, 1998.

Barley is grown throughout Australia's 'grain belt'. All the states of Australia contribute to this production. However, production in Tasmania and Queensland is very limited due to extreme climatic conditions.

South Australia has the greatest level of production amongst the states, followed by Western Australia, Victoria and New South Wales. Approximately one third of Australia's barley production is sold as malting barley. Exhibit 3 illustrates the break down of barley production by state. Please note that these are total barley crop (feed and malting barley) figures.

Exhibit 7. Breakdown by state.

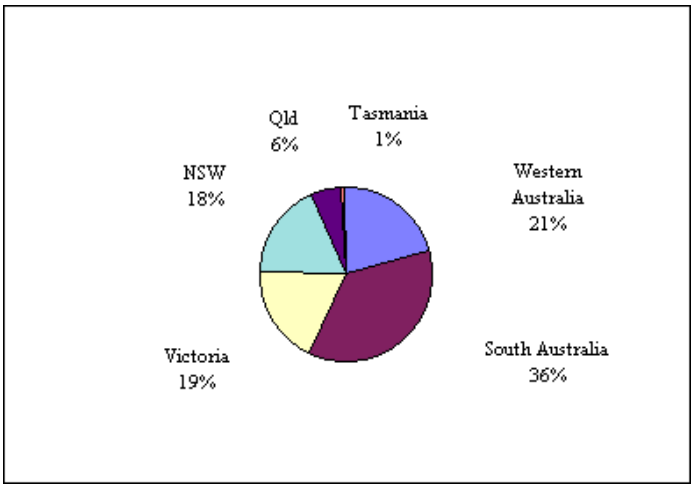




Source: ABARE, 1996, ABARE, 1997.

It is interesting to view the total production by state contribution, as shown below.

Exhibit 8. Barley production by state - average 1988-1998.



Source: Australian Barley Board, 1998.

The Australian Barley Board has three malting barley grades which it accepts from growers. These grades are classified according to protein levels, with Malt 1 having an 11% maximum protein level, Malt 2 having an 11.8% maximum protein level, and Malt 3 has a 13% maximum protein level.

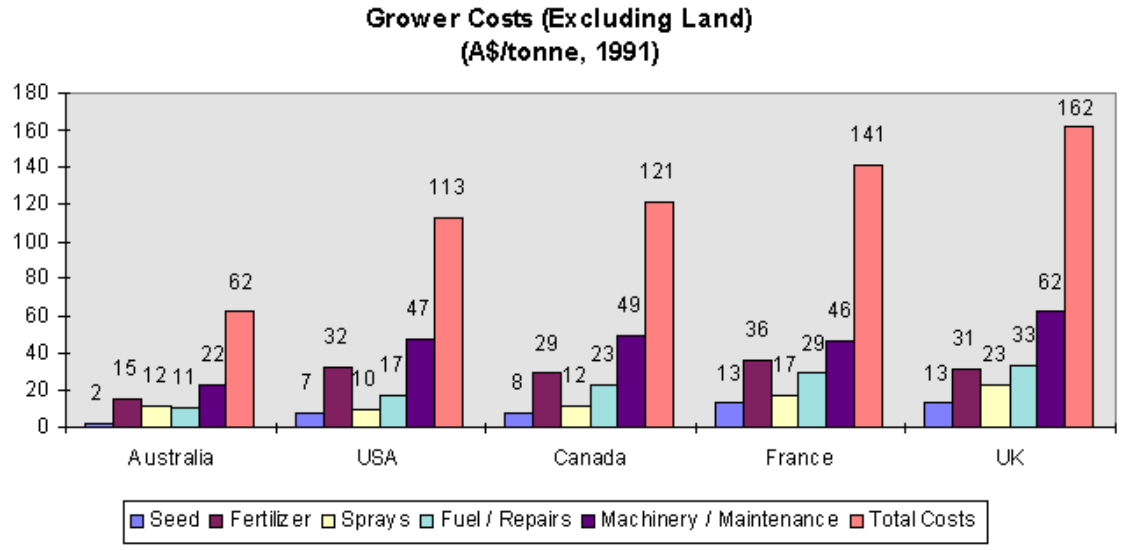
By comparison, the Grain Pool of Western Australia does not have separate grades within barley categories (except for Stirling malting barley, which has two grades). Instead they pay a premium or a discount for barley received depending in the protein levels. This provides an incentive for growers to always strive for better protein levels, rather than simply a certain level of protein.

Australia's Comparative Advantage.

Australia's main competitor in the barley industry is Canada, with other competitors being the United States, the European Union and Turkey. While Australia has been market leader, Canada has caught up in terms of production quality and innovation. Australia is now ranked number three. This is largely due to Australia failing to keep up with market developments in terms of new varieties and was slow to innovate. The last five years, however, have seen a focus on research and development, with the grains Research and Development Corporation liaising with industry participants in many research and development projects(discussed below in section 5).

The Australian Barley industry has a distinct comparative advantage over its competitors in terms of production costs. Australia is the lowest cost producer of malting barley of all the worlds major suppliers. The cost of producing a tonne of barley in Australia is A$62, this compares favourably with the cost of our major competitor, Canada where the cost of producing a tonne of barley is A$121. Exhibit 8 illustrates comparative costs amongst the worlds major producing nations.

Exhibit 9. Grower costs (excluding land).



Source: ABARE and Boston Consulting Group 1995 (latest available figures)

The competitive edge gained by Australian producers due to their high level of efficiency is eroded by the high level of subsidies offered in

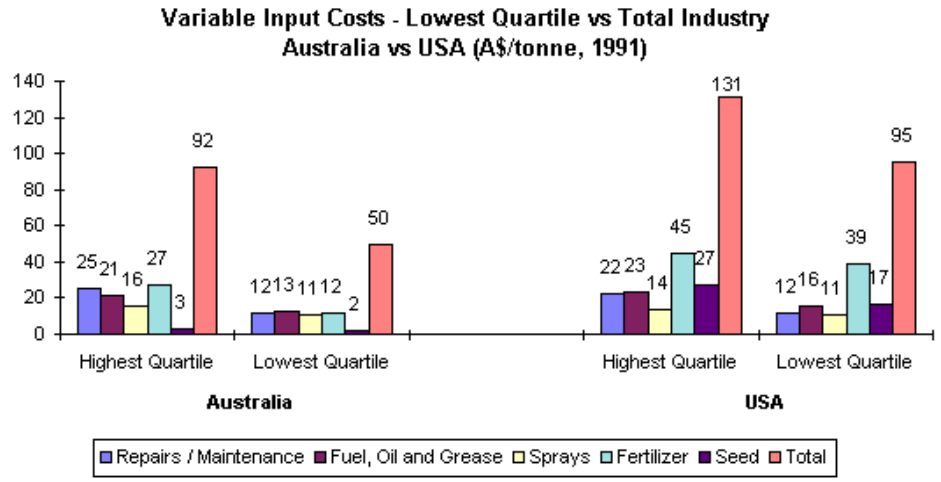
competitor nations. Exhibit 9 shows the level of subsidies offered per tonne of malting barley produced to growers in the worlds major producing nations.

Exhibit 10. Malting barley subsidies.

Country	Subsidy A$/tonne
Australia	0
Canada	45
U.S.A	32
European Union	127
Source: Boston Consulting Group 1995	

The comparative advantage the Australian industry has in terms of cost could be substantially greater. This is because variation in costs amongst Australian growers is substantially greater than the variation in competing nations. For example in 1991, the most efficient quartile of producers in Australia incurred costs which were 84 per cent less than those of the least efficient quartile. In the U.S.A the same comparison produced only a 37 per cent variation. (Boston Consulting Group 1995). Exhibit 10 illustrates a cost variation comparison between the U.S.A and Australia and indicates the extent to which each area of costs is responsible for this variation.

Exhibit 11. Costs.



Source: ABARE & Boston Consulting Group 1995

Exhibit 10 illustrates that high cost growers in Australia are incurring excessive costs in areas which are easily managed. Cost areas such as repairs and maintenance, sprays, fuel, oil and grease could be reduced by high cost growers by implementing better management techniques and the use of better machinery and technology. It is apparent that even though Australia already has a comparative advantage in terms of cost over its major competitors there remains a realistic ability to increase our efficiency and as a result increase this comparative advantage.

Australian malting barley has a more important comparative advantage in terms of quality. It is clean, it is generally of large plump grain size, it has a low moisture content, it is mould free and it is generally free of chaff and other detritus and has a clean, bright colour which is desirable in many markets. These are more important competitive advantages, as the growers' margins have no effect on the price of the commodity, as stated in the previous section.

Marketing.

Unlike other coarse grains, the marketing arrangements in Australia for barley are highly regulated. Each of Australia's five major grain producing states (see figure 3. plus Queensland) has a Statutory Marketing Authority (SMAs) which has either vesting or compulsory acquisition powers over all barley produced in that state. These powers allow the SMAs to control the domestic and international marketing of both feed and malting barley. The SMAs and the states in which they operate are displayed below.

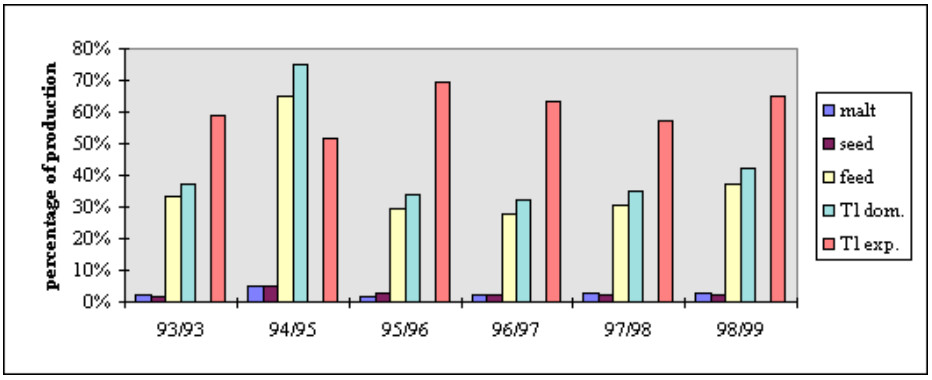
Marketing Authority	State (s)
Australian Barley Board	Victoria, South Australia
Grain Pool of Western Australia	Western Australia
New South Wales Grains Board	New South Wales
Grainco	Queensland

The SMAs are more flexible in taking up their vesting rights over feed barley, particularly on the domestic market, than they are with malting barley. This brings some flexibility into the marketing system as the statutory bodies can, at their discretion, authorise other individuals or organisations to participate in the domestic barley marketing process. This flexibility can take the form of licences allowing growers to sell malting barley direct to maltsters, or permits allowing (some 100) grain merchants to operate alongside the statutory authority in the domestic feed barley market.

While the SMAs are responsible for a majority of Australia's international barley marketing, they have allowed some authorised private organisations to participate in international marketing. These organisations are multinational grain traders and the main ones include: Glencore, Itochu, Loui Dreyfus, Marubeni, Toepfer, J.K.International, Mitsui and Top Glory.

Between 1993 and 1997 Australia on average exported 61% of its barley production. The highest level of exports was in 1995/96 at 69% and the lowest in 1994, at 51%. This is in contrast to the (albeit extraordinarily) high level of barley that was exported in 1986, at 91.9% of the domestically produced crop. Exhibit 11 illustrates the supply and disposal of Australian Barley, from the 1993/94 - 1998/99 years of production. Please note that the figure shows total domestic usage and total export usage, of which two, only domestic usage shows the breakdowns of feed barley, seed and malt (and other human use).

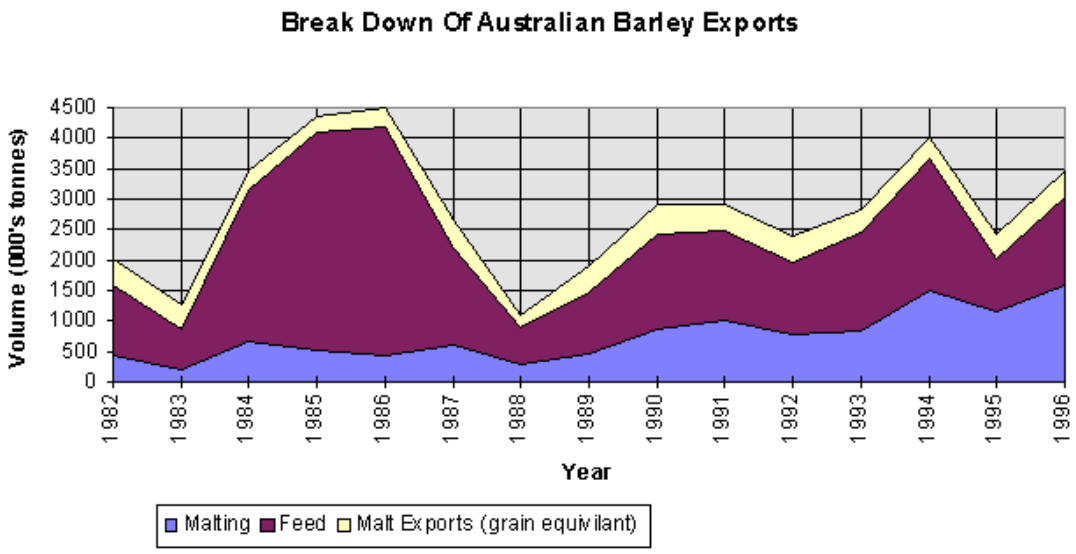
Exhibit 12. Supply and disposal of barley (1993/94 - 1998/99)



Source: ABARE, Australian Crop Report, June 1998.

Exhibit 12 illustrates breaks down Australia's exports into feed barley, malt barley and malt (in terms of its grain equivalent).

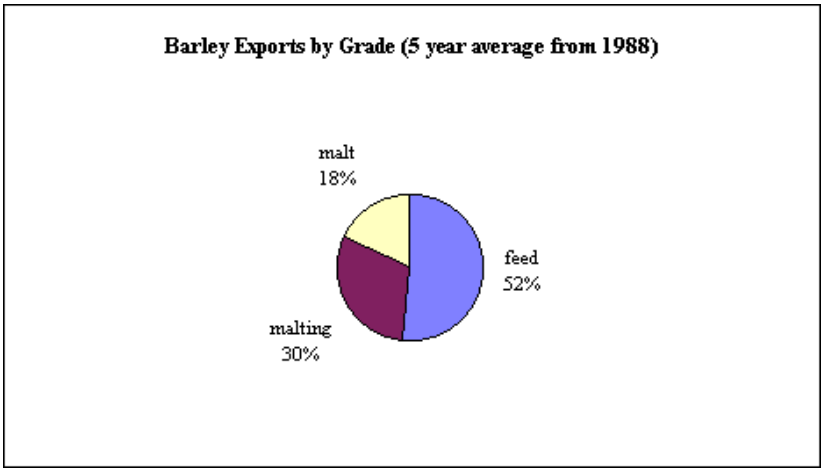
Exhibit 13. Exports (1982 - 1996)



Source: Chudleigh 1997

Exhibit 14 depicts the five year average of Australia's barley exports by grade.

Exhibit 14. Barley Exports by Grade (5 year average from 1988).



Source: Cropping Industries - Agriculture Coarse Grains, 1995.

According to the USDA the size of the world malting barley export market in 1996-97 was 3.4 million tonnes. Australia had the largest share of this market with 53% followed by Canada worth 24 % and the EU at 21 %.

In 1993 (last available figures) Australia's largest export destinations for barley were the Middle East (777 thousand tonnes), Japan (705 thousand tonnes) and China (400 thousand tonnes). Exports to the Middle East comprised entirely of feed barley, in contrast to China where exports were comprised entirely of malting barley. A majority of sales to Japan were feed barley, however, both malting barley and malt were substantially represented. Other significant markets for Australia are Taiwan, the Philippines and from time to time the former Soviet Union has been a substantial purchaser (eg. 250 thousand tonnes in 1991). Data after 1993 is scarce and that which is available varies from source to source and so, is quite probably unreliable.

In 1993 South America was also a market in which Australia held a strong position. However, since then Australia's position has deteriorated substantially in that market. In 1993 exports to South America were 129 thousand tonnes which fell to 12 thousand tonnes in 1994 and recovered to 25 thousand tonnes in 1996. Korea has also been an attractive market for Australia's malting barley exports. However this market has changed dramatically in recent years. It has seen a dramatic shift toward the import of malt rather than malting barley. In 1989 Korea imported 30 thousand tonnes of malt of which Australia supplied 20 thousand tonnes, in 1992 this market had grown to 68 thousand tonnes of which Australia supplied only 18 thousand tonnes.

The major potential growth market which is apparent for the Australian industry in the short term is China. The brewing industry in China has grown at almost 25 per cent since 1978. In the medium to long term other potential growth markets which have been identified are Vietnam, Thailand and India.

In August 1993 an independent committee of inquiry chaired by Professor Fredrick Hilmer completed an extensive review of National Competition Policy. The report handed down by the committee recommended that all organisations involved in the malting barley industry should not be protected from competition. The recommendations contained in the report will be implemented unless it can be shown that such policy changes would not be in the public interest. Australia has developed a history for undergoing such structural reform and it is expected that a significant number of the recommendations in the Hilmer report will be implemented. The result of such structural change will be a better more cost efficient service being offered to Australia's malting barley customers. It has been agreed that the results of this report will be implemented by the year 2000.

Deregulation is expected to commence from late 1998. The ABB and the NSW Grains Board are currently under internal review. The ABB is expected to deregulate its feed barley market within 1 year and the domestic malting barley within 2-3 years, it is expected to retain the rights over export malting barley. The NSW Grains Board aims to complete the review by October 1998 and the expectation is that it will retain all malting barley vesting powers.

The effects of deregulation will be to free up the market, sharpen competition and enhance services provided to growers and to markets. It is expected that the industry will become more market driven and more responsive to market signals as the lines of communication between grower and market are shortened. There is the possibility that proactive development of markets may suffer a lack of focus until the industry adjusts to the new structure.

Research.

The growth in the Chinese brewing industry is Australia's major current opportunity to secure an increasing volume of sales and a larger share of the world export market. To take advantage of this the Australian industry has realised it must provide a quality product which is desired by its customer. It has been the failure to do this previously which has been identified as the reason for losing market share in other markets such as Japan and South Korea. Too often in the past Australian research has concentrated on improving agronomic performance for producers rather than product performance in the hands of the end user.

There are many organisations involved in scientific research to improve Australia's barley production. The major organisations involved in this research are the CSIRO Plant Industries Division, the Grains Research Development Corporation (GRDC), the CRC for Plant Industries and the Brewing and Malting industries. These organisations and industries have begun a collaborative with the aim to securely establish Australian barley as the highest performing product in the international brewing markets.

The specific characteristics identified and targeted for improvement are;

> Diastatic power; is the ability to produce enzymes which convert starch in the grain into fermentable sugars during the brewing and malting process. Diastatic power impacts on the ability to produce alcohol in the brewing process. Failure to convert this starch can result in cloudy beer.
>
> Protein levels; protein level is highly correlated with diastatic power. However, where protein levels are high and correspondingly so is diastatic power, malt production is low. Researchers are attempting to develop varieties which satisfy both the need for diastatic power while maintaining an acceptable level of malt extract. The Australian Barley Board has introduced three different grades for malting barley. These are divided in terms of protein content, and as a result buyers are more able to select grain for their individual needs.
>
> Grain size; scientists are aiming to engineer varieties which will produce more consistent and desirable grain sizes. Grain size is an important factor in the malting process.

There appears to be every reason to be confident that Australia's research will be successful. The release of several new varieties is imminent. These include a 'Parwan' replacement for Northern Victoria, 'Harrington' to be grown in Western Australia and a high diastase line 'TG 121-1' for Queensland and Western Australia.

In addition to the type of research discussed above, there have been trials on the effectiveness of malting barley as a cattle feed. American studies have found that cattle fed malting barley have significantly higher growth rates and weight gain than those fed on feed barley. Dr Andrew Barr, the leader of the South Australian Barley Improvement Program, has shown that malting barley varieties have a higher nutritional value than feed barleys. It is to be noted, however, that the opportunity that this creates for the malting barley industry is somewhat negated by the lower yields from malting barley varieties.

Trends and Expectations

ABARE (1997) have made forecasts and projections relating to the Australian barley industry through until the 2001/02 season. The table below illustrates the key points from these forecasts.

Exhibit 15. Forecasts for the barley industry.

Year	Area Planted (000's ha)	Production (000's tonnes)	Malting Barley Price (real, $A)	Feed Barley

				Price (real, A$)
1997/98	3189	5554	160	129
1998/99	3102	5438	165	133
1999/00	3024	5355	168	133
2000/01	2959	5343	170	133
2001/02	2895	5333	171	132

It is seen from the table above that Australian barley production is forecast to contract slightly over the next 5 years. This contraction will be caused by an increase in wheat and oilseed production over the same period. These forecasts are highly dependant on the real price forecasts which are also included. In recent years grain prices have been extremely volatile, continued volatility may cause some fluctuation from the above forecasts.

It is expected that as population and incomes grow throughout developing Asia that demand for all grains will grow significantly. It appears as though the demand for barley will grow significantly as the Chinese brewery industry growth is likely to be repeated in other developing Asian nations. Demand for malting barley in Europe also appears to be increasing, in 1994 Australia made its first export sale to Europe for more than a decade. The growing demand for meat in Asia, Latin America and North Africa is likely to put further pressure on world demand for all grains for use as stock feed.

A trend has emerged in both Canada and the EU toward increased plantings of oilseeds such as Canola, it is expected that this trend will result in a fall in the level of production of malting barley. The implications of the Uruguay round of GATT may also be significant. The fact that all of the major players in the world malting barley markets except Australia, are heavily subsidised will mean that as the world moves toward free trade, production in these countries is likely to fall.

Australia has a comparative advantage over its competitors in terms of production costs for many agricultural products, as seen in Exhibit 5. As a result Australia is likely to benefit from further trade liberalisation. Australia has been a world leader in the fight for free trade over the past two decades. Prior to the Uruguay round of GATT Australia was involved in the formation of what is known as the 'Cairns Group' of countries. This group consists of 14 countries, who like Australia are world leaders in efficient agricultural production. The 'Cairns Group' has around 25 per cent of the world's agricultural export trade. Through this group Australia will continue to pursue trade liberalisation until trade barriers and assistance policies have been reduced to the lowest possible levels world-wide.

The Australian barley industry anticipates that, due to increasing sophistication in the world's brewing industries, demand will begin to increase for malt rather than the raw product, as has been the case in Japan and South Korea. China is expected to repeat this trend as it develops further. In the mean time as China and other markets move toward this level of sophistication their demand for barley will become dependant on specific characteristics of the product. Australia needs to ensure it is in a position to supply both the quality and quantity of specific parcels of grain which are demanded by its customers. The Australian barley industry has recognised this and has begun preparing itself for this situation through its new research and variety breeding programs, improved handling methods, stricter grading of grain and a move toward deregulation of the industry.

Conclusion.

The Australian malting barley industry is in a position to secure its future. Many opportunities exist for industry participants if they are able to meet them in what is a rapidly changing and growing world market. Australia's malting barley industry has a significant opportunity to secure its position in the Chinese markets provided it learns from its previous weaknesses in markets such as Japan and Korea.

Lost market share and lower prices relative to our competitors in the Japanese markets are a strong indication of the weakness Australia has shown in satisfying the needs of brewers in a sophisticated industry. This situation arose due to Australia's poor recognition of customer needs and the correspondingly slow development and production of varieties which better served these needs. However there are promising signs that the mentality which led to this situation is recognised to be unhelpful and a new approach driven by customer needs has arrived.

Due to both fortunate circumstances and its recent ability to recognise and rectify problem situations, the Australian malting barley industry has an opportunity not often available in a competitive marketing environment. That is, Australia has a opportunity to quickly regain its market share in the Japanese, Korean and South American markets. This opportunity has resulted from the move toward trade liberalisation, expected falls in production in competitor nations (due to subsidised fallowing of land), the imminent release of new varieties

which will better satisfy customer needs, the implementation of better handling and grading techniques by the SMAs and the greater efficiencies which will be offered by deregulation of the industry.

It is expected that the Australian barley industry will be able to supply high quality malting barley in significant volume to its customers in the future. In particular to the Chinese market as significant effort has been put into monitoring and forecasting future demands in terms of both quantity and quality in this market. Australia has the potential to achieve the status of the world's premium supplier of high quality malting barley and maintaining that position as long as sufficient financial rewards are available to growers.

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Footnotes.

1 - Paper presented at the 10th Annual Conference of the Chinese Economic Studies Association of Australia, the University of Sydney, Orange Australia, 13 - 14 July 1998. This paper is part of the research project 'Prospects of Chinese and Australian Barley Markets' jointly funded by the Asian Agribusiness Research Centre of Orange Agricultural College, the University of Sydney, and the College of Economics and Management of China Agricultural University. Part of the research work for this paper was completed while the author was a Visiting Professor at the Asian Agribusiness Research Centre during June - August 1998. The authors acknowledge the research assistance of James Hooper in preparing some of the material for this paper.

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