Department of Agriculture
Government of Western Australia

Assessment of Western Australia's Export Markets

For

Genetically Modified Canola

May 2004

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Executive Summary

Genetic modification has the potential to significantly improve crop productivity. However, the use of genetic modification in crops has caused mixed public debate. Recent media publicity and changes in regulations in countries, reflects varying reactions to the introduction of GM crops. There are some countries that have shown greater acceptance to GM foods, such as the US, and others such as the European Union (EU), who have displayed a low tolerance to the introduction of GM foods to date.

The market forces that have influenced the level of acceptance of genetically modified (GM) crops include the level of consumer awareness, food safety issues, Government regulatory systems and industry's willingness to adopt new scientific technology. The difficult question is whether concerns will remain or, as consumers become more aware and confident with GM products, will these concerns diminish over time. The influence of multinational agri-chemical and seed companies developing the technology and the environmental benefits and/or constraints have also impacted on the rate of adoption of GM crops in different countries.

There is currently a five-year moratorium on the commercial release of GM food crops in Western Australia (WA). The moratorium commenced in 2001 and was under review in early 2004 for the commercialisation of Monsanto Australia's Roundup Ready® canola and Bayer Crop Science's InVigor ® hybrid canola into WA. After public consultation, the Minister for Agriculture Hon Kim Chance decided to enforce the ban by issuing an order under the GM crops Free Areas Act 2003.

The potential market acceptance of introducing GM canola into WA is very important as 93 per cent (5 year average from 1998/99 to 2002/03) of WA's canola is exported. WA has undertaken a study on the international canola markets to determine the potential affects of introducing GM canola to the current export markets. The analysis segregated the exports markets into three categories: low risk, medium risk and high risk and each level of risk reflects the likely impact on the WA canola export industry if GM canola was to be introduced.

In 2002/03, WA's canola grain exports were valued at A$140.2 million, with 99.9 per cent of the exports sold to six markets - Japan, Pakistan, India, Bangladesh, the European Union (EU) and Malaysia. This study found that all of the markets are investing to various degrees in GM crop technology. They also have developed or are in the process of developing regulations to govern the production and trade of GM foods.

Japan, Pakistan, India, Bangladesh and Malaysia were identified as low risk markets if GM canola was introduced in WA. Japan was classified as a low- risk market because of its heavy reliance on Canadian GM canola and the presence of zero GM DNA in refined canola oil. Japan has also invested heavily in biotechnology research. Japan was the largest market for WA canola and imported 84 per cent of total canola exports from WA in 2002/03. Pakistan purchased 13.4 per cent of WA canola exports, India (1.3%), Bangladesh (0.72%) and Malaysia (0.01%) in 2002/03.

These markets were considered low-risk markets, due to a low level of public concern about GM's and willingness to accept the technology within their own countries.

The five low-risk markets accounted for 99.6 per cent of WA's total canola exports in 2002/03.

The EU was considered high-risk market due to the high level of consumer concern about food safety and GM products. However, canola exports to the EU are inconsistent and fluctuate yearly. On a five year average, the EU market has accounted for less than 1 per cent of WA's total canola exports.

In 2002/03, only two EU countries (Belgium-Luxembourg and Portugal) imported canola from WA and this accounted for 0.4 per cent of WA's total canola exports.

Based on the 2002/03 sales, there is the potential loss of 0.4 per cent of WA canola export markets if GM canola was introduced to the state.

1 Introduction

In May 2001, the Western Australian Minister for Agriculture announced an interim, five year moratorium on the commercial production of genetically modified (GM) food crops in WA to allow issues associated with market impacts, identity preservation and the feasibility, risks and benefits of establishing GM and GM free zones to be fully debated in the community.

In 2003, the Office of the Gene Technology Regulator (OGTR) has issued two licences one to Monsanto Australia and one to Bayer CropScience for the commercial release of a GM canola variety in Australia. The OGTR is responsible for issuing licences for the commercial release of GM crops in Australia. The OGTR is part of the Australian Department of Health and deals exclusively with risks that may be posed by genetically modified organisms (GMOs) to human health and safety or to the environment. Economic issues and the marketability of GM crops are not issues covered by the OGTR.

The OGTR issued the first GM canola licence to Bayer CropScience on 25th July 2003 for InVigor® hybrid canola. The decision followed extensive evaluation and extended public consultation. The studies concluded that the health, safety and environmental impacts from InVigor® canola are as safe to humans and the environment as conventional (non-GM) canola. InVigor® GM canola to contain two new characteristics – a hybrid breeding system and tolerance to the herbicide glufosinate ammonium, Liberty® herbicide (Bayer CropScience, 2002).

On 19th December 2003, the OGTR issued the second GM canola licence for the commercial release of Monsanto Australia's Roundup Ready® canola. Roundup Ready® canola had been previously trialled under limited and controlled conditions in Australia over a number of years and is approved for growing and food use in Japan, Canada and the United States (US). Roundup Ready® canola is tolerant to glyphosate, the active ingredient of Roundup® herbicide and will allow the application of glyphosate for control of weeds that emerge following planting and emergence of the canola crop.

However, the State Government's *Genetically Modified Crops Free Areas Act 2003* (the Act) came into effect on 5th January. The Act enables the Minister for Agriculture to make orders designating areas of the State (including the whole State) where GM crops generally, or specified GM crops, may not be cultivated commercially for the purpose of preserving the identity of non-GM crops for marketing purposes. The Act provides the capacity to exempt field trials from an order.

To assist the Minister for Agriculture in making an order under the Act, public comments were invited on:

- Whether the order should apply to GM crops generally, or whether it should only apply to the two GM canola varieties.
- The risks of adverse impacts on the marketing of non-GM products if these GM canola varieties are commercially released in Western Australia.

- The capacity for industry self-regulation of the GM canola supply chain to manage any adverse marketing impacts, without additional costs to non-GM producers in Western Australia.

The submissions for public consultation closed on 28th February 2004 and a report was completed and presented to the Minister for Agriculture at the end of March 2004. The outcome was that the Minister made an order under the Act designating the whole of the State as an area where genetically modified crops must not be cultivated.

In this report, that both canola and rapeseed are referred to as canola. Canola is a subset of rapeseed and can only be termed so if the oil contain less than 2 per cent erucic acid, and the solid component (meal) of the seed must contain less than 30 micromoles of any one or any mixture of 3-butenyl glucosinolate, 4-pentenyl glucosinolate, 2-hydroxy-3 butenyl glucosinolate, and 2-hydroxy-4-pentenyl glucosinolate per gram of air-dry, oil-free solid.

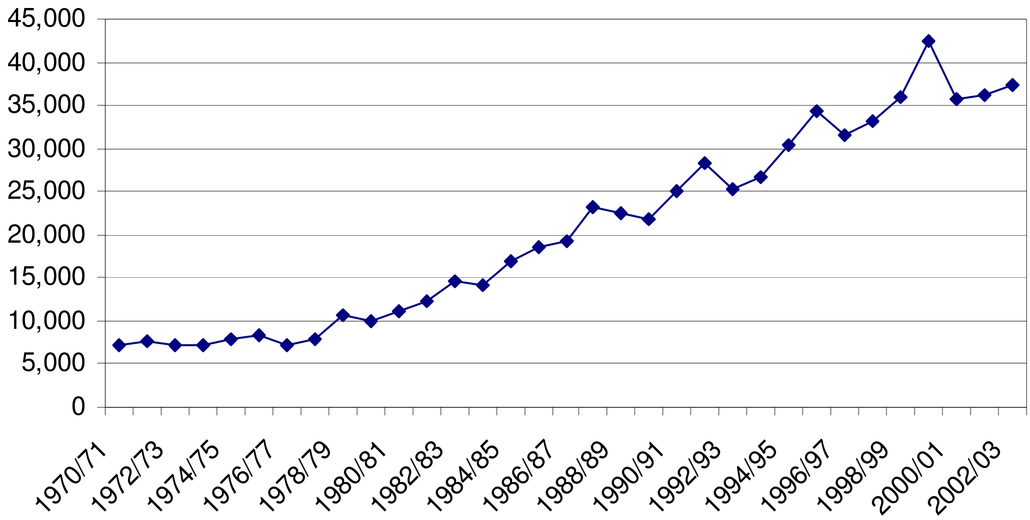
Canola was bred in the 1970 in Canada to reduce the erucic acid levels which made it a healthier oil. The name was changed from rapeseed to canola so that the nutritional and quality characteristics could be easily identified. Canola was decided on as it is a combination of Canada and oil. Rapeseed is still produced but it contains higher levels of erucic acid. Today, rapeseed is mainly used for industrial purposes as high erucic acid levels for human consumption have been linked to Keshan's disease.

2 World canola industry

2.1 Production

The canola industry first emerged about 60 years ago during the Second World War for motor oil and engine lubricants (Carmody, 2002). World canola production has increased significantly with the most dramatic increases occurring from the late 1970's through to the late 1990's after the development of low erucic varieties (Figure 2.1).

Figure 2.1: World canola production, 1970-2003 ('000 tonnes)



Source: ABARE, 2003

World canola production peaked in 1999/00 at 42.4 million tonnes, an 18 per cent increase from the previous year (1998/99). During this period, the increase in demand was driven mainly by an increase in canola oil for cooking.

Since the peak in 1999/00, production has declined by approximately 8 per cent per annum to 2002/03. This was mainly due to adverse growing conditions in both Australia and Canada. In 2003/04, canola production rebounded to a point were it was the second biggest canola crop ever recorded reaching 38 million tonnes.

The top five canola producers in the world are China, the EU, Canada, India and Australia (Table 2.1). On a five year average (1998/99 to 2002/03), China has produced approximately 31 per cent of world canola, the EU 25 per cent and Canada 17.5 per cent. Australia ranks as the fifth largest producer of canola with 3.7 per cent of world production.

Table 2.1: World canola production ('000 tonnes)

	1998/99	1999/00	2000/01	2001/02	2002/03	5 year Av
China	8,300	10,132	11,381	11,331	10,552	10,339
EU	9,517	11,484	9,043	8,858	9,286	9,638
Canada	7,643	8,798	7,205	5,017	4,178	6,568
India	4,900	5,110	3,725	4,500	3,600	4,367
Australia	1,690	2,460	1,905	1,797	841	1,739
Poland	1,099	1,132	958	1,064	995	1,050
Czech Republic	680	931	844	973	710	828
Bangladesh	254	254	249	238	260	251
Pakistan	292	279	297	231	221	264
Russia	125	135	148	140	115	133
Others	675	1,189	895	1,029	996	957
World Total	**35,885**	**42,525**	**37,559**	**36,086**	**32,460**	**36,903**

Source: USDA, 2004

2.1.1 Adoption of GM Canola

There have been rapid and extensive adoptions of GM crops in North and South America. The most sought after trait in GM crops is herbicide resistance with 73 per cent of GM crops grown in 2003 displaying this trait. Insect resistant crops make up another 18 per cent. GM canola occupied 3.6 million hectares (5% of total GM production) in 2003, up from 3 million hectares in 2002 (James, 2003). GM producing countries dominate world grain trade, with 42 per cent of canola being traded by GM producing countries. This would be as high as 80 per cent if intra EU trade was excluded (Berry, Foster & Hogan, 2003).

At this stage Canada and the United states are the only two countries producing GM canola. Canada is the dominate exporter of canola in the world and in 2003, approximately 70 per cent of canola produced in Canada was GM (Foster, 2003). Canadian GM canola is not segregated from conventional canola.

2.2 World Canola Exports

Over the past five years, world canola exports have varied from a low of 4.7 million tonnes to a high of 8.9 million tonnes (Table 2.2). In 2002/03, the top five canola exporters in the world in descending order were Canada, the EU, Australia, Czech Republic and Hungary.

Table 2.2: World canola exports ('000 tonnes)

	1998/99	1999/00	2000/01	2001/02	2002/03	5 yr Av
Canada	3,878	3,901	4,836	2,673	2,400	3,538
EU	708	1,888	591	472	845	901
Australia	1,530	1,842	1,429	1,450	520	1,354
Czech Republic	170	400	375	368	257	314
Hungary	40	125	140	110	110	105
Romania	15	65	50	65	65	52
Lithuania	33	85	40	25	45	46
Poland	130	325	34	292	40	164
Ukraine	35	37	73	68	22	47
Russia	25	32	54	24	20	31
Others	26	76	10	79	84	55
World Total	**6,836**	**8,912**	**7,852**	**5,844**	**4,692**	**6,827**

Source: USDA, 2004
Note: descending order based on 2002/03 figures.

2.2.1 Canada

Canada is the world's largest canola exporter with average exports of 3.5 million tonnes or 52 per cent of global trade. Canadian exports have been as high as 4.8 million tonnes (2000/01) when Canada accounted for over 62 per cent of the world canola trade. In 2002/03, Canada's top export markets were Japan, Mexico and the US.

It is important to note that there have not been any significant changes in Canada's exports markets during this time period even after the introduction of GM canola in 1996 (Table 2.3).

Table 2.3: Canada's canola export markets - 1992/93-2002/03 ('000 tonnes)

	1992/ 93	1993/ 94	1994/ 95	1995/ 96	1996/ 97	1997/ 98	1998/ 99	1999/ 00	2000/ 01	2001/ 02	2002/ 03
Japan	1,485	1,662	1,655	1678	1,734	1,829	1,814	1,801	1,854	1,590	1,574
Mexico	104	434	495	531	356	593	529	570	846	631	547
US	14	253	261	272	265	391	278	280	165	106	195
China	-	-	252	-	-	11	1,269	1,211	1,890	214	-
EU	272	868	1,139	322	162	11	1	1	-	2.1	-
Other	1	130	110	1	1	128	9	22	104	1	190
Total	**1,876**	**3,347**	**3,912**	**2,804**	**2,519**	**1,964**	**3,878**	**3,901**	**4,836**	**2,673**	**2,400**

Source: Statcom, 2004 and Statistics Canada, 2003
Note: descending order based on 2002/03 figures.

Prior to 1996, the major export markets for Canada were Japan, Mexico, the EU and the US. After the introduction of GM canola in Canada, all of these export markets continued to purchase canola from Canada with the exception of the EU.

The EU market was not a big loss to Canada as it was considered an opportunistic market. There were only two years; 1993/94 and 1994/95, where Belgium purchased 12.5 per cent and 8.7 per cent respectively of Canada's canola. As a consequence of the EU's bans on importing GM canola, Canada developed China as a new canola market.

2.2.2 European Union

In 2002/03, the EU is the second largest exporter with 18 per cent of world canola trade. It is anticipated that the EU's canola trade will increase by 40 per cent when the EU expands its member countries to include ten of the eastern European states from 1st May 2004. Most of the EU trade is within Europe and does not compete with Canadian or Australian canola exports on a regular basis.

The two major producers and exporters of canola from the EU are France and Germany.

France is the largest exporter of canola in the EU. France's major markets are Germany (39%), Belgium/ Luxembourg (21%), UK (6%), Pakistan (7%), Japan (2%) and others (25%). France, dominants the EU market due to its proximity and associated freight savings.

Germany is the second largest canola exporter in the EU. The EU purchases approximately 60 per cent of Germany's canola exports and the major markets are in Great Britain (17.5%), Sweden (13%), Belgium (10%), Denmark (10%), France (4.5%) and Netherlands (4%). China purchased 40 per cent of Germany's crop in 1999/00 however since then; sales have declined to about 10 per cent. Both Pakistan and Bangladesh periodically purchase canola from Germany.

With the dominance and competitive advantage of both France and Germany in the Northern Hemisphere, there are limited opportunities for WA canola exports into the EU. Australia is the second largest non-European canola exporter with 20 per cent of global canola exports.

2.3 World canola imports

In 2002/03, Japan, Mexico, the EU, Pakistan and Canada were the major canola importers. Japan is the largest canola importer in the world with a five year average of 2.1 million tonnes and 33 per cent of world imports (Table 2.4).

Table 2.4: World canola imports ('000 tonnes)

	1998/99	1999/00	2000/01	2001/02	2002/03	5 yr Av
Japan	2,174	2,231	2,180	2,080	2,111	2,155
Mexico	785	1,014	881	961	657	860
EU	957	862	927	879	628	851
Pakistan	180	480	315	374	425	355
Canada	158	123	224	226	230	192
Bangladesh	155	272	250	179	185	208
China	2,195	3,678	2,361	775	51	1,812
Poland	14	19	5	3	30	14
Czech Republic	10	15	5	12	10	10
Algeria	8	5	5	5	5	6
Others	89	47	32	21	26	43
World Total	**6,725**	**8,746**	**7,185**	**5,515**	**4,358**	**6,506**

Source: USDA 2004
Note: descending order based on 2002/03 figures

2.3.1 Japan

Canada is the dominant supplier of canola to Japan and consistently purchases canola from the major canola exporters of the world (Table 2.5).

Table 2.5: Total imports of canola into Japan

	Total Imports ('000 tonnes)	Exporting Country (% sales)		
		Canada	WA	EU
1997/98	2,106	70%	5.50%	0.05%
1998/99	2,110	75%	9%	2.60%
1999/00	2,201	82%	9%	1%
2000/01	2,240	83%	6%	0%
2001/02	2,060	70%	10%	1%
2002/03*	1,590	75%	16%	3.9%

Source: Statcom, 2003
Note: * August 2002 to April 2003

Canada's exports to Japan have remained reasonably stable, with sales between 1.4 million tonnes in 1997/98 to a peak of 1.8 million tonnes in 2000/01. Seasonal growing conditions in Canada has had an affect on supply over the past couple of years and in 2001/02, Canada's exports to Japan decreased by 12 per cent, mainly due to the drought. Nonetheless, Canada maintained its majority of market share in Japan with 70 per cent of total canola imports.

Canada has been growing GM canola since 1996 and growers have quickly adopted the technology. In 2003, 71 per cent of total canola production in Canada was GM.

To date there has been minimal impacts on trade due to the GM status of the Canadian canola. GM canola is not segregated from conventional canola

WA's canola exports to Japan have been steadily increasing over the past seven years and sales peaked in 2002/03 at 242,000 tonnes. This represented 16 per cent of total canola imports into Japan. The EU canola sales into Japan are small and are normally less than one per cent of the total imports. However in 2002/03, sales increased to 3.9 per cent of the total market. Most of the EU canola exports are supplied by France.

The Japanese market continues to be driven by security of supply and access to high quality seed. Japan responds to these issues by allocating canola imports across a number of different suppliers around the world. Australia is consistently allocated around 400,000 tonnes and this is used to countervail the market power of Canada.

2.3.2 Mexico

Mexico has been a consistent buyer of canola and in 2002/03, represented 15 per cent of total canola imports. Canada predominately supplies this market due to geographic proximity and freight advantages as canola can be transported from Canada to Mexico by either ship or rail. This is an ideal scenario when shipping freight rates escalate which is currently the situation.

2.3.3 EU

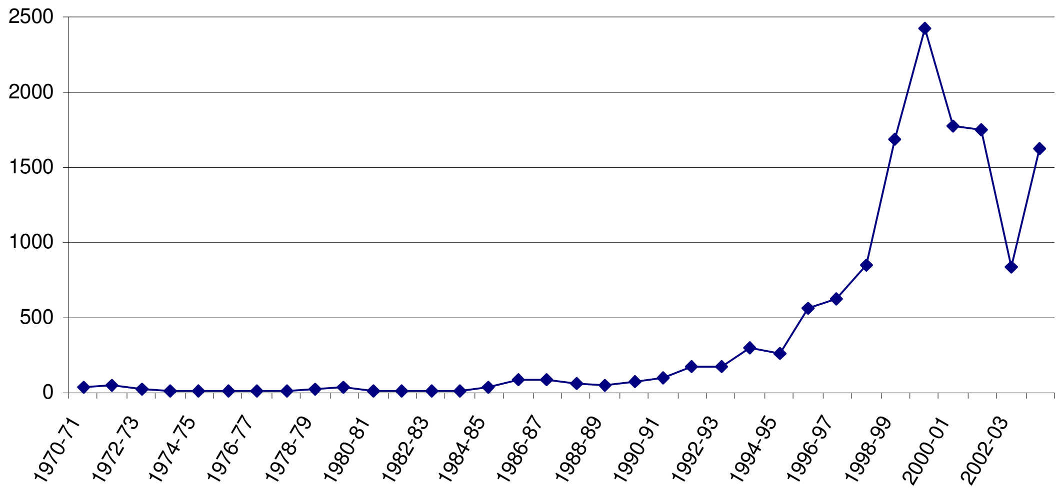
When combined, the EU was the third largest canola importer in 2002/03 with 14 per cent of global imports. These requirements are mostly serviced from intra EU trade. However, in years of decreased production, the EU will outsource canola and in most cases this is from Australia.

3 Australian canola industry

3.1 Production

Australian canola production has undergone a rapid expansion from relatively small plantings in the early 1990's to the third largest field crop grown, behind wheat and barley (Figure 3.1).

Figure 3.1: Australia canola production ('000 tonnes)

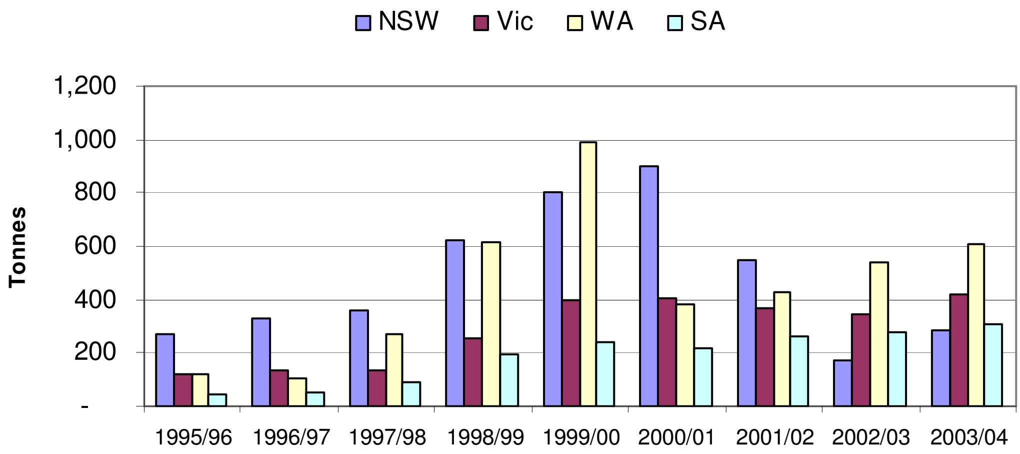


Source: ABARE, 2004

Canola has become a valuable cash crop for farmers and also provides an important disease break in many cereal rotations in cropping regions receiving 300 mm plus of annual rainfall. The average canola plantings for the past three years have been approximately 1.3 million hectares.

Over the past nine years there has been a marked increase in canola production in Australia. The biggest increases have occurred in WA and New South Wales (NSW) (Figure 3.2).

Figure 3.2: Australia canola production by state ('000 tonnes)



Source: ABARE, 2004

Prior to 2001/02, New South Wales (NSW) dominated canola production with a 5 year average of 667,000 tonnes or 40 per cent of total Australian production. Since 2001/02, canola production has declined in NSW and WA has become the major canola producing state. NSW production was only 13 per cent of total Australian production in 2002/03 and 17 per cent in 2003/04.

Domestic demand for canola in Australia has stabilised at around 400,000 tonnes per year. Future growth in the domestic market is limited due to marginal population growth. However, if new canola varieties are developed in the future that have improved oil characteristics, demand could increase particularly in the food service industry. This would reduce the demand for imported palm oil. The commercial development of Bio-diesel could also increase the domestic demand for canola oil.

Further expansion in the domestic crushing industry is also restricted due to the inadequate scale of operations. To be competitive in the international market, Australian crushing plants need to be sizeably larger. Furthermore, high import tariffs on vegetable oil in many countries restrict incentives for local expansion in the domestic crushing industry.

3.2 Exports

Australian canola exports have expanded in line with the increased canola production over the past 10 years. Average Australian canola exports in recent years have been around 1.1 million tonnes. Exports have been as high as 1.9 million tonnes in 1999/00 following a record canola crop of 2.4 million tonnes and as low as 0.6 million tonnes following the drought in 2002/03 (Table 3.1).

Table 3.1: Australian canola export markets ('000 tonnes)

	1998/99	1999/00	2000/01	2001/02	2002/03	5 year Av
Japan	293	370	375	395	444	376
Bangladesh	126	99	114	152	70	112
China	394	1,212	295	336	50	457
Pakistan	43	57	224	307	39	134
India	10	5	1.2	25	7	9.8
EU	315	-	362	63	1.2	148
Malaysia	4	19	16	25	0.18	12.8
Mexico	124	97	-	-	-	44.2
Other	10	34	57	282	0.33	20.3
Total	**1,319**	**1,894**	**1,444**	**1,303**	**612**	**1,314**

Source: Agriculture Market Intelligence Centre (AMIC), 2004
Note: descending order based on 2002/03 figures.

In 2002/03, Japan, Bangladesh, China and Pakistan were the major export markets for Australian canola. These rankings change noticeably when the five averages is taken into consideration.

The most noticeable change in the rankings of the top Australian export markets for canola in 2002/03 was China. Based on a five year average, China is Australia's largest canola export market. This was mainly due to over 1.2 million tonnes of canola imported into China in 1999/00. However, the Chinese market is inconsistent and canola sales decreased by 75 per cent in 2000/01 to 295,000 tonnes. In 2002/03 Australia sold only 50,000 tonnes to China.

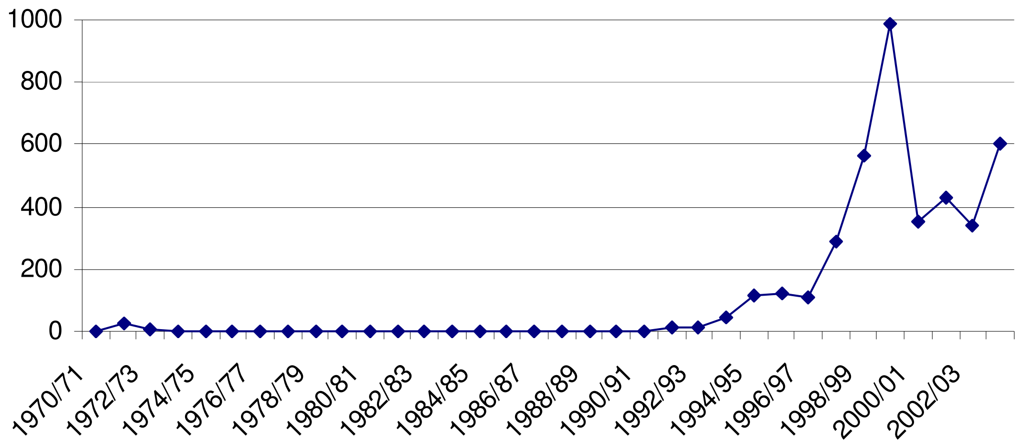
The EU market is also highly erratic for Australian canola exports. In 1998/89 and 2000/01 there were supply shortages from intra EU markets and the EU imported over 300,000 tonnes respectively. These sales were large compared to more recent canola sales by Australia of 60,000 tonnes in 2001/02 and 1,200 tonnes in 2002/03. The high import years have distorted the five year average and are misrepresentative of EU canola imports from Australia.

4 Western Australian Canola Industry

4.1 Production

Canola production in WA has expanded rapidly over the past seven years from 1996/97 where there was 106,000 tonnes of canola grown to a record of just less than one million tonnes in 1999/00 (Figure 4.1).

Figure 4.1: Canola production in Western Australia ('000 tonnes)



Source: AMIC, 2004

Since then, canola production has declined due to late starts to the winter rainfall growing season. In 2002/03, WA canola production decreased by 21 per cent from 429,000 tonnes in 2001/02 to 340,000 tonnes in 2002/03. However, in 2003/04, canola production increased by 76 per cent to 600,000 tonnes.

4.2 Exports

In 2002/2003, approximately 85 per cent of canola produced was exported with a total value of A$140.2 million. This was significantly less than the 2001/02 season where A$180 million was exported, due to drought conditions across much of WA.

In 2002/03, the five major export markets for WA canola were Japan, Pakistan, India, Bangladesh and the EU (Table 4.1). The major change in sales in 2002/03 was China as it did not purchase any WA canola. Compared to previous years, China has purchased 55 per cent (473,300 tonnes) of WA canola exports which was in 1999/00.

Table 4.1: Western Australia's canola export markets ('000 tonnes)

	1998/99	1999/00	2000/01	2001/02	2002/03	5 year Av
Japan	186.1	198	176.3	207.6	242.3	202.1
Pakistan	10	16.6	3.5	87.2	38.5	31.2
India	4.4	-	1.3	-	3.6	1.9
Bangladesh	18.9	32.3	1.9	-	2.1	11
EU	0.19	-	47.5	0.67	1.1	9.9
Malaysia	3.8	14	16.1	2.6	0.02	7.3
China	224.2	473.3	135.4	114.4	-	189.5
Mexico	123.9	97.2	-	-	-	44.2
Singapore	-	33	-	-	-	6.6
Other	2.7	0.04	0.38	0.13	0.02	0.67
Total	**574.5**	**864.5**	**382.5**	**412.5**	**287.7**	**504.3**

Source: AMIC 2004
Note: descending order based on 2002/03 figures

From 2000/01 to 2002/03, the major changes in WA's canola export markets were:

- Japan increased imports by 17 per cent between 2000/01 and 2001/02 and a further 17 per cent from 2001/02 to 2002/03;
- Pakistan increased imports by 25-fold from 2000/01 to 2001/02 but fell by 56% from 2001/02 to 2002/03; and
- China did not import any canola in 2002/03. This was a drop of 114,000 tonnes from 2001/02.

4.3 Marketing

The Grain Pool Pty Ltd (GPPL) currently purchases between 80 to 90 per cent of the WA's canola crop each year and is the main license holder for bulk exports of canola in WA. A new State Grain Marketing Act commenced on the 1st November 2002 which:

- Created a Grain Licensing Authority (GLA) as a means of separating the regulatory function from the marketing role of the existing GPPL. The GLA is responsible for issuing special licences for the export of bulk canola to markets where the GPPL does not achieve a price premium.
- Issued a "main licence holder", essentially a "single desk" for the bulk export of canola from WA to GPPL by force of the new Act.

Under the new Grain Marketing Act there are no restrictions on the export of containerised canola, processed canola, canola oil or canola meal from WA. The exports of processed canola from WA have been negligible to date.

The GLA became operational on 1st July 2003 and started receiving applications for special export licences for prescribed grains (feed and malting barley, canola and narrow leaf lupins) in September 2003. In the 2003/04 season, there was one special export licence issued for canola to the sub-continent for 48,000 tonnes. There were two applications rejected by the GLA; one for 45,000 tonnes to the sub-continent and the other for 40,000 tonnes to Japan which was appealed to the minister and rejected.

5 Western Australia's Export Markets

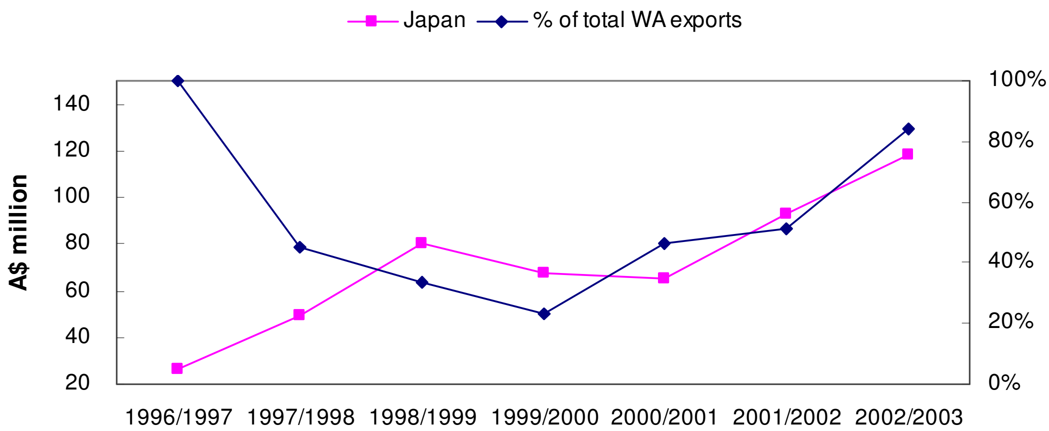
In this section, all WA canola export markets in 2002/03 have been analysed to determine the potential impact of commercialising GM canola in WA. The analysis included determining the GM status for each market and classifying them into either a low, medium or high risk market for the state. This was achieved by investigating the GM legislation, GM imports, commercialised GM crops and trials, consumer concerns towards GM, the level of biotechnology investment in each market and the impact on the WA's canola industry if GM canola was commercialised.

5.1 Japan

5.1.1 Market overview

Japan has been WA's largest canola export market for the past three years. In 2002/03, canola exports to Japan were valued at A$117.9 million and represented 84 per cent of the total value of WA canola exports (Figure 5.1).

Figure 5.1: WA's canola exports to Japan



Source: AMIC, 2004

Since 1996/97, canola exports to Japan have increased by 414 per cent increase over the past seven years. Even though drought conditions were experienced across much of WA in 2002/03, Japan still imported approximately 40,000 tonnes more canola from WA than in 2001/02. This was achieved through reduced exports to markets such as Pakistan and no sales to price sensitive markets like China.

5.1.2 Market acceptance of GM

Japan is a large importer of canola and crushes approximately 200,000 tonnes of canola per month (Manitoba Agriculture and Food, 2001). The Japanese oil manufacturing industry relies on large-scale production and low prices, as the cost of facilities and equipment are high. The Japanese market has not been concerned with GM canola to date and is more concerned with the costs of production. The costs would escalate if there was a requirement for segregation of GM and non-GM canola so at this stage; segregation is not economical in Japan.

The Japanese are aware that using GM canola for producing edible oils possesses few problems as once canola is crushed and the oil is refined, no DNA material remains in the oil. There are currently no labelling requirements for processed canola and soy oil in Japan as current tests cannot detect any DNA material in the processed oil (ABARE 2003). Canola oil is the most popular vegetable oil in Japan.

There are a number of Consumer Co-operatives in Japan that are strongly against GM foods. The Shuktoken Consumers' Co-operative Union, Seikatu Club Consumers Co-operative Union and the Green Co-ops Unions have zero tolerance to GM foods and GM food ingredients. These Co-operatives have approached oil manufactures and requested them to produce non-GM canola oil. However, these requests are for a total of 10-15,000 tonnes of non-GM canola oil.

Considering that Japan imported 2.1 million tonnes of canola in 2002/03 for crushing, the request for non-GM canola oil accounts for less than 1 per cent of the market demand.

The Japanese Consumers' Co-operative (JCCU) is generally against GM's. However, it is not prepared to pay for non-GM canola if the price is more expensive. JCCU has already experienced some difficulty with selling Australian non-GM canola oil as it is more expensive.

Yoshihara Oil is the only company supplying non-GM Australian canola oil to a major supermarket – AEON (formally known as JUSCO).

In June 2003, The Society for Techno-innovation of Agriculture, Forestry and Fisheries (STAFF) conducted an awareness survey on GM crops and food stuffs in Japan. The results show that if information campaigns on the safety of GM food were increased, consumers can be motivated to accept GM foods (Checkbiotech 6th June 2003).

Some other significant findings of the survey were as follows:

- Seventy per cent (70%) of consumers are highly aware that recombinant technology is useful to facilitate farming in inhospitable environments and remedy food shortages.

- Consumers are highly concerned over the effects of farming on local environments and are still uncomfortable with eating GM foods.

- Half or more than half of consumers are not aware that the Ministries of Health, Labour and Welfare and Agriculture, Forestry & Fisheries carry out safety verification evaluations for GM food.

- Sixty-two per cent of the respondents were familiar with the issue of "labelling." Fifty one per cent said their purchase of GM food is conditional - depending on its safety and price. The consumers said they would buy GM food if the price is lower by 25 per cent or more compared to non-GM food

5.1.3 Legislation and labelling

Japan introduced legislation in 2000 to prevent the import of products for food use which contain biotech varieties that are not yet approved in Japan. To enforce this legalisation, Ministry of Health, Labour and Welfare (MHLW) routinely samples and tests imported food stuffs at port of entry. This testing if focused on GM foods that are commercially produced in countries aboard but are not yet approved in Japan. Foods found to contain unapproved biotech varieties must be re-exported, destroyed or diverted to non-food use. As result of this legislation and testing procedures, one GM variety of potato, two varieties of GM Papaya and one GM corn variety have been detected that were not approved for food use in Japan (GAIN Report 2003).

Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF) is responsible for the environmental safety, feed safety approvals and GM labelling for foods. On April 1, 2001, MAFF established a labelling scheme under the Japan Agricultural Standards (JAS) which requires labelling for GM food products if GM DNA or protein can be detected in finished food products (GAIN Report 2003).

Labelling standards in Japan allow for a 5 per cent threshold for 'unintended GM content' of approved GM products and a zero tolerance for non approved GM products (Leading Dog Consulting, 2001). In addition to this for a food to be labelled "non GM", certification has to be shown that the ingredients were handled on an "identity preserved" (IP) basis at each step of the production and distribution process. Under current labelling regulations, vegetable oils such as soybean and canola oil are not included in the list of products, which must be labelled as GM or derived from GM crops as refined oil removes any traces if GM material (GAIN Report 2003).

In July 2002, Japan's Ministry of Health, Labour and Welfare (MHLW), who are responsible for granting food safety approvals for biotech products, approved three GM crops, one GM corn variety and two GM soybeans varieties as safe for human consumption. The approved crops were insect-resistant, herbicide-tolerant GM corn (from Dow Chemical Co) and two varieties of herbicide-tolerant GM soybeans (from Aventis). As of December 2002, MHLW had approved 44 GM crop varieties for food use (GAIN Report 2003). This includes six varieties of corn and one variety of soybean, sugar, beet, potato, canola and cotton (Reuters News, 17th July 2002).

In April 2003, MAFF introduced mandatory assessment checks on feed safety. By tightening these regulation, Japan is banning the import and sale of unapproved GM varieties for use in livestock feed. A 1 per cent tolerance level has been set for unintentional commingling on unapproved feed varieties being imported into Japan. This legislation was brought into effect after the discovery of an unapproved GM corn variety in a feed shipment. Up until this new legislation was introduced testing of GM feed shipments was voluntary (GAIN Report 2003).

MAFF will test samples from grain cargoes at its laboratories nationwide and order importers to destroy or return cargoes with more than 1 per cent adventitious presence of unapproved GM varieties (Food Chemical News, October 2002).

5.1.4 Biotech R&D investments

The Japanese Government has compiled a set of strategic principles for the development of biotechnology in Japan. These principles include an action plan for the appropriate use of genetic engineering in food products and strengthen R&D in other fields such as regenerative medicine and genomic drugs. The Government's plans were developed to compete with the US and Europe in the biotechnology field (Dow Jones International News, 18th July 2002).

Ministry for Economy, Trade and Industry (METI) is managing an innovative Green Biotechnology Program and invested 4 billion yen in 2001. It aims to reduce its dependence on crude oil imports through biotechnology and will create a new foundation for its biotechnology industry by 2010 (Reuter, 2001).

In a five year agreement the International Rice Research Institute is working in conjunction with Japan's National Institute of Agrobiological Sciences to find the genes in rice that will strengthen varieties against drought, diseases and pests (AgraFood Biotech 2003)

5.1.5 Risk analyses and conclusions

Japan is the most important market for WA canola due to the quantities purchased the ability to attract premium prices and the benefits of established long-term relationships. It is the only country that imports significant amounts of the full range of grains from Western Australia including wheat, barley, oats, canola and lupins.

Japan has been classified as a low risk for GM canola for the following reasons:

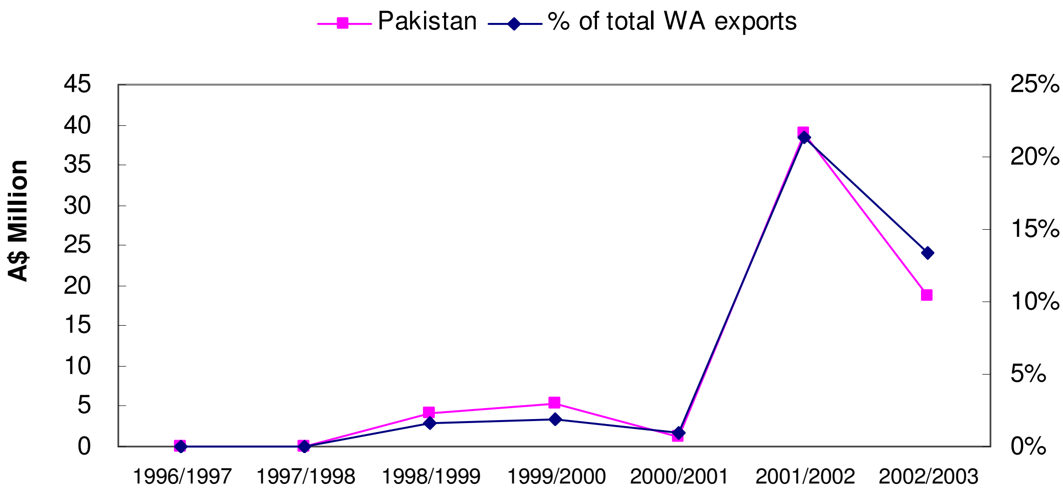
- Japan is already highly reliant on GM canola from Canada. Approximately 70 per cent of Canada's canola production is GM and since Canada supplies 80 per cent of annual canola imports into Japan, a large portion of Japan canola is GM.
- GM labelling was introduced in Japan in April 2001. Highly processed products such as soy sauce and canola oil do not require specific GM labelling.
- It currently imports GM grains for both human and animal consumption from Canada, the US and South America.
- Japan recently approved three varieties of GM corn and soybean for human consumption, and there are now a total of 44 varieties of GM crops approved for use in Japan.
- The Government is developing new principles in regards to biotechnology. One of their aims is to gain public trust on genetically modified foods by creating a safe monitoring system (Factiva, July 18th 2002).
- Current demand for non-GM canola by consumer co-operatives is for less than 1 per cent of the total canola imports.
- The majority of Japanese are not prepared to pay a premium for non-GM food due to the depressed economy and the lack of concern about GM foods by the general public.

5.2 Pakistan

5.2.1 Market overview

In 2002/03, Pakistan was WA's second largest canola export market. Canola exports were valued at A$18.7 million and represented 13.4 per cent of WA's canola exports (Figure 5.2). Pakistan's canola imports from WA were down 56 per cent from 87,000 tonnes in 2001/2002 to 38,000 tonnes in 2002/03, primarily due to the drought in 2002/03.

Figure 5.2: WA's canola exports to Pakistan



Source: AMIC, 2004

Pakistan's canola imports represented approximately 6 per cent of the world canola imports. However, canola imports are steadily increasing due to the recent construction of oilseed crushing. With the increase in canola crushing capacity, there has been an increase in the production of canola meal. The additional meal is causing a problem and Pakistan is currently looking to develop export markets for canola meal as well as further developing intensive animal feeding.

Traditionally, the EU has been the major supplier of canola to Pakistan. However Australia also regularly exports canola to Pakistan but has a smaller market share than the EU. GPPL is currently trying to develop a larger market share in Pakistan but this development has been slow due to the past reputation of providing canola with lower and inconsistent oil quality.

Some forecasts predict that Pakistan's canola imports from Australia will increase from 39,000 tonnes in 2002/03 to 200,000 tonnes in 2003/04.

5.2.2 Market acceptance of GM

The general public of Pakistan have little knowledge of GM technology. Other issues such as political instability are currently occupying the Pakistan population. However in December 2002, a foods rights group sought a court order to stop the import and sale of GM food in Pakistan as it believed they may have hazardous effects on human health and the environment. The group proposed a moratorium be put in place until the government establishes a regulatory frame work and ascertains the safety of such products (Interpress Service, 3rd December 2002).

In general Pakistani farmers are reluctant to use GM seeds and as a result there is a certain degree of hesitation amongst consumers.

5.2.3 Legislation and labelling

Pakistan lifted its ban on the importation of GM grains in late 2002. There is currently no legislation or labelling requirements for GM products in Pakistan

Although Pakistan is a signatory to the International Biosafety Protocol, it has not yet finalised its bio-safety guidelines. The guidelines being developed would put in place legal requirements for the regulation of imports, exports, safety, transport, sale and handling of GM crops and foods (Checkbioteck, 14th March 2003).

5.2.4 Biotechnology R&D investments

The Pakistani Ministry of Science & Technology is developing a project to promote biotechnology R&D. The project has been allocated Rs38 million (A$1.17 million), and will focus on improving research in agriculture, livestock, and medical sectors at universities and R&D organisations (Government of Pakistan, May 21st 2002).

Aside from increased R&D, the Minister for Science and technology has stated that there will be development of internationally accepted laboratories and efforts will be made to create linkages with foreign labs (Government of Pakistan, 16th July 2002).

Pakistan and the USA are planing a joint operating arrangement worth US$10 million in the plant genomics and biotechnology areas. The areas of cooperation include the exchange of plant germplasm, stress biology, bioinformatics, IT in agriculture, identification and control of disease, dryland/sustainable agriculture production systems and biotechnology/microbiology and agribusiness development (AgraFood Biotech, 26th November 2002).

5.2.5 Risk analyses and conclusions

Pakistan purchased 13 per cent of WA canola exports in 2002/03 and is an important market for the WA's canola industry. At present, Pakistan has been classified as a low risk market for the following reasons:

- There are currently no GM legislation and regulation requirements such as GM labelling in Pakistan however this will change shortly with the development of biotechnology policies; and

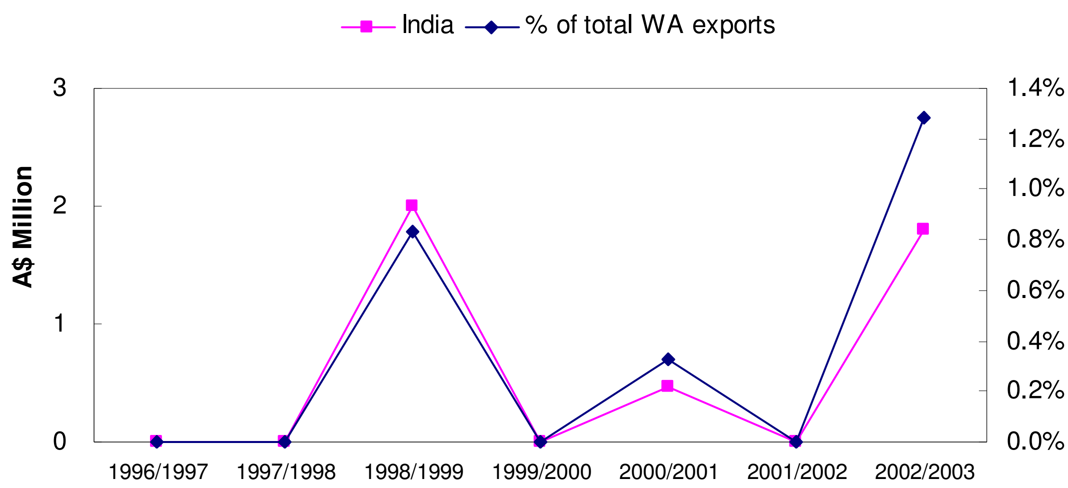
- Currently, there is limited public concern about GM's.

5.3 India

5.3.1 Market overview

In 2002/03, India was the third largest market for WA canola comprising of 1.3 per cent of total canola exports from WA. In 2002/03, India purchased 3,647 tonnes of canola worth A$1.8 million. India has not been a consistent export market for WA canola, purchasing it three out the past seven years. India's largest purchase was in 1998/99 where it imported 4,416 tonnes of canola (Figure 5.3).

Figure 5.3: WA's canola exports to India



Source: AMIC, 2004

5.3.2 Market acceptance of GM

GM crops have attracted many critics and acrimonious debates among Indian scientists, policy makers, farmers, consumers and social workers (DOIR 2004).

The absence of any Indian labelling requirements and the lack of segregations of GM products from sources such as the USA and Canada have made it difficult to assess the consumers' reaction to and acceptance of GM produce. There is however a general market preference amongst consumers for natural products (DOIR 2004).

The market reaction to the introduction of GM cotton seeds last year was mixed, and far from encouraging due to poor yields reported in certain Indian states. These results fell below the expectations by the farming community (DOIR 2004).

Genetic modification of food crops are vocally opposed by a few groups in India. These groups are using the media to create negative publicity.

Nonetheless, the majority of the population have not heard of GM products and there is a low level of consumer awareness and concerns.

5.3.3 Legalisation and labelling

In India, the planting of transgenic crops is totally regulated by the government. These crops can only be planted in the open fields with the prior permission from the Department of Biotechnology (DBT) in the Ministry of Science and Technology. They are regulated according to the DBT Guidelines, originally framed in 1998 (DOIR 2004).

The Committees involved in regulating the import of transgenic seeds for research purposes in small-scale field trial and large-scale field trials are given below (DOIR 2004);

- **Institutional Bio-safety Committee (IBSC):** A proposal to carry out any project involving genetic manipulation of micro-organisms, plants and animals is discussed in IBSC within the Institution / University / Commercial Organisation. IBSC comprises of members from the host institution, a DBT representative and an external expert. The IBSC has to be duly approved by the DBT.

- **Review Committee on Genetic Manipulation (RCGM):** Following approval from IBSC, an application is prepared and submitted to the Review Committee on Genetic Manipulation. RCGM functions from the Department of Biotechnology and constitutes of representatives from various government departments. RCGM discusses the proposal and may recommend the proposal to the Monitoring cum Evaluation Committee (MEC) for agronomic benefits evaluations.

- **Monitoring cum Evaluation Committee (MEC):** After detailed deliberations, MEC recommends the modified application back to the RCGM. MEC comprises of the agricultural experts from various Universities and Institutes.

- **State Biotechnology Coordination Committee (SBCC):** RCGM issues Letter of Intent (LoI) to the institution seeking permission to conduct transgenic project and a copy is marked to the Chief Secretary of the State in which trial is planned. The SBCC is headed by the Chief Secretary of each of the Indian States and has the powers to grant consent to carry out transgenic research and inspect and investigate the activities related to GM products in their respective states. The committee nominates representatives for such activities.

- **District level Coordination Committee (DLCC):** The District Collector heads this Committee and monitors the safety regulations associated with the GM products.

- **National Bureau of Plant Genetic Resources (NBPGR):** For import of small quantities of transgenic seeds, RCGM recommends the issuance of an Import Clearance from DBT. Based on this Clearance, the NBPGR, issues a permit to import the transgenic seeds into the country.

- **Genetic Engineering Approval Committee (GEAC):** This Committee functions under the administrative control of the Ministry of Environment & Forests. GEAC is empowered to issue large-scale trials of GMOs in drugs, food, etc. GEAC is only empowered to take care of the environment safety.

In April in 2002, the GEAC approved the release of three Bt cotton varieties for production over a three year period in the south west of the country. Another Bt variety of cotton for the northern production areas was denied release by GEAC as there was insufficient test data to make a safety assessment. This decision to release the Bt cotton has boosted the moral of India's cotton growers and research scientists but has angered environmental groups who claim sufficient testing has not been completed and that adequate bio-safeguards are not in place (GAIN Report 2002).

The decision by GEAC to approve the release of Bt cotton has rekindled the debate in India on whether to label products derived from GM crops as there is a strong view that cottonseed oil and other GM food products should be labelled. While these views are strong, the GEAC has yet to come to terms with the feasibility of identity preservation (IP), traceability and even the technology for testing for GM material in crops and food (GAIN Report 2002).

In April 2004, India approved a fourth strain of GM cotton despite an increasing opposition from environmentalist and some farmer groups. This seed can only be cultivated in central and south India, as the government has not allowed GM crops to cultivated in the north and east regions. These regions account for most of India's food grain production (Checkbiotech, 2nd April 2004).

5.3.4 Biotechnology R&D investments

Biotechnology is one of the fast moving sectors in India, next to Information Technology, and is well-positioned to take a quantum leap forward in the next five years or so, with a projected turnover of approximately US$ 4.5 billion (DOIR 2004).

The importance of biotechnology was formally recognised by the Indian government with the establishment of an independent department, The Department of Biotechnology (DBT) a subsidiary of the Ministry of Science and Technology. The DBT focuses on research and development activities that are allocated among a number of academic institutions and government agencies. The DBT aims to develop a well-qualified human resource base, infrastructure, and centres of excellence, as well as support R&D and manufacturing activities (DOIR 2004).

India's public sector leads in GM research, with 20 academic and research institutes conducting transgenic research on 16 different crops. In contrast there are only seven private sector companies conducting research on 10 crop types (Checkbiotech, 25th February 2004).

In January 2004, the Indian government announced the establishment of The Plant Genome Research Road Map, a six year plan to develop new GM crops with improved nutrition. Whilst India is currently self sufficient in most of its food requirements its population is expanding quickly and food resources will become scarce. Therefore, there is a great need for foods with higher nutritional levels (Checkbiotech, 5th January 2004).

The Indian government has already developed a GM potato that is nutritionally enhanced. This particular potato has been engineered that contain 30 per cent more protein than normal potato. The potato is at its final stages of approval with GEAC and it is hoped that it will help address the increasing problem of malnutrition in India (Checkbiotech 13th November 2003).

5.3.5 Risk analysis and conclusions

WA canola exports to India are small and inconsistent with sales occurring in only three out of the last seven years. Sales in 2002/03 were the second highest over the past seven years however this represented 1.3 per cent of total WA exports. Therefore India has been classified as a low risk market for WA canola exports if GM canola was introduced due to the following reasons;

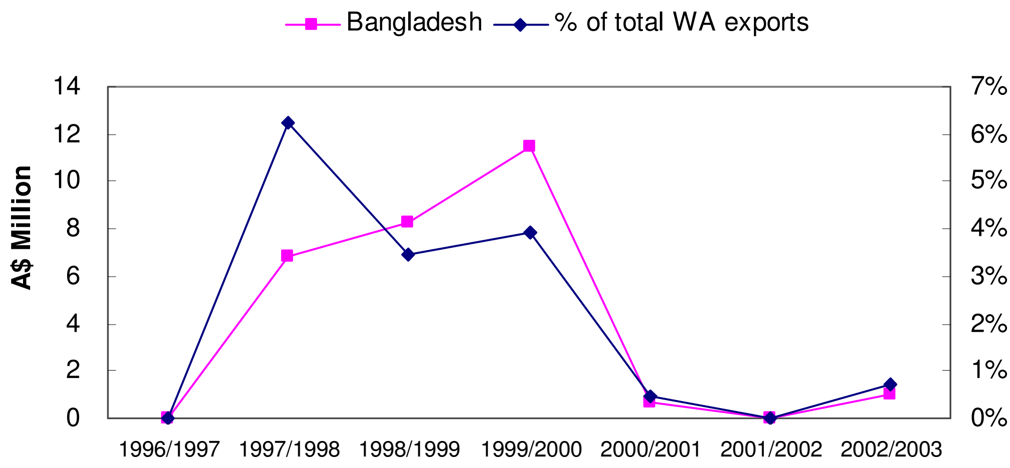
- Currently India has no labelling requirements for GM foods.
- There are currently three Bt cotton varieties in commercial production in India.
- It is anticipated that an enhanced protein GM potato will be commercialised in the near future.
- Many additional GM crops are currently being developed for the Indian market and
- The imports of WA canola are irregular and small.

5.4 Bangladesh

5.4.1 Market overview

Bangladesh was the fourth largest market for WA canola in 2002/03, importing 2,068 tonnes ($A0.99 million). This accounted for 0.72 per cent of WA canola exports in 2002/03. WA canola sales to Bangladesh peaked in 1999/00 at 32,000 tonnes but have decreased to significantly smaller parcels in the past three years (Figure 5.4).

Figure 5.4: WA's canola exports to Bangladesh



Source: AMIC, 2004

The total yearly oilseed crush in Bangladesh is 580,000 tonnes of which 220,000 tonnes is imported canola. Bangladesh's oilseed crush accounts for approximately 15 per cent of total consumption of edible oil with the remainder made up of imported crude and refined vegetable oils.

5.4.2 Market Acceptance

There is very little information available on consumer perceptions of GM crops in Bangladesh as it is a new concept to the public.

In September 2003, a seminar on 'GM technology in food security and the rights of the consumer' was conducted by the Consumers Association of Bangladesh (CAB) to help create more consumer awareness about GM crops and food (The Daily Star, 12th September 2003).

5.4.3 Legalisation and Labelling

In 2003, Bangladesh was still struggling to form the National Committee on Bio-safety of Bangladesh (NCBB), four years after the formulation of the 'Bio-safety Guidelines'. This inability to establish the NCBB has lead to the obstruction of applications of GM crops which will not be approved until the monitoring committee (NCBB) is established.

With the regulatory body not in place, Bangladesh has not been able to release GM crops for commercial cultivation. When the NCBB is established, it will oversee that cultivation is in compliance with bio-safety policies and guidelines (Checkbiotech, 19th August 2003).

Whilst the composition of the NCBB has already been established in the bio-safety guidelines, the Ministry of Science and Information and Communication Technology (ICT) and the Ministry of Environment and Forestry fail to see eye to eye on leadership of the committee (Checkbiotech, 19th August 2003). A primary consensus has been reached that the ICT would give lead in biotech research and the Ministry of Environment and Forestry in bio-safety rules, but no initiative has been taken so far to form the body (Checkbiotech, 19th August 2003).

5.4.4 Biotech R&D Investments

Bangladesh is lagging behind its neighbouring countries in harnessing crop biotechnology, even though it has just been included in the consortium of four south and south-eastern Asian countries for a $15 million Programme for Bio-safety Systems (PBS) and the Agricultural Biotechnology Support Project-II (ABSP-II). These are both funded by United States Agency for International Development (USAID). In this consortium, comprising Bangladesh, India, Indonesia and the Philippines, all but Bangladesh have established a bio-safety regulatory body (Checkbiotech, 19th August 2003).

In October 2003, Bangladesh in the combined projects with USAID developed a variety of ‘golden rice’ based on a conventional variety adapted to the growing conditions in Bangladesh. An application for permission to set up trials for the ‘golden rice’ has been made. However, the approval for this needs to be given by the NCBB which is still not established (Checkbiotech, 25th October 2003).

5.4.5 Risk Analysis and Conclusion

Bangladesh is a small market for WA canola. However, there are opportunities for growth as there are forecasted increases in demand for edible oils. France, Canada and the rest of Australia are WA’s largest competitors in the Bangladesh canola market.

Bangladesh has been classified as a low risk market for the following reasons;

- Bangladesh is already importing GM canola from Canada.
- There is low public concern about GM products.

However, the establishment of NCBB in the near future could mean that imports of GM crops into Bangladesh will be more tightly control. This inturn could increase the awareness of the public about GM foods.

5.5 European Union

5.5.1 Market overview

In 2002/03, the EU purchased 1,100 tonnes of canola from WA which accounted for 0.4 per cent of WA's total canola exports. There were two EU countries (Belgium-Luxembourg and Portugal) that imported canola from WA and the EU

Belgium-Luxembourg has been the most consistent but small buyer of WA canola in the EU and purchased 1,056 tonnes in 2002/03. It has imported a total of 2,342 tonnes (A$1.2 million) over four years from 1996-97 to 2002-03.

In 2002/03, Portugal purchased 44 tonnes of canola, valued at A$29,650. This was the first time, Portugal had purchased WA canola.

Table 5.1: WA's canola exports to the EU (tonnes)

	Tonnes						
	1996/97	**1997/98**	**1998/99**	**1999/00**	**2000/01**	**2001/02**	**2002/03**
Belgium-Luxembourg	-	518	102	-	-	666	1056
Germany	-	-	22	-	47,510	-	-
Netherlands		3,150	63	-	-	-	-
Portugal	-	-	-	-	-	-	44
% of total WA exports	**0.0%**	**1.3%**	**0.0%**	**0.0%**	**12.8%**	**0.2%**	**0.4%**

Source: AMIC, 2004

Over the past seven years, there have been only four European countries that have purchased canola from WA. These countries are Germany, Belgium-Luxembourg, Portugal and the Netherlands (Table 5.1).

Germany has been the biggest buyer of WA canola from the EU over the past seven years. The majority of canola sales were however in 2001/02 when Germany imported 47,510 tonnes ($A18 million) of WA canola. This represented 12.8 per cent of the total canola exports for that year. There was only one occasion in 1998/99 when Germany purchased 22 tonnes of WA canola.

5.5.2 Market acceptance of GM

In recent times, European consumers have become increasingly concerned with food safety issues. This has been fuelled by several crises including Bovine Spongiform Encephalopathy (BSE) and Foot and Mouth Disease. GM products have caused much concern to the European public since the first GM grains were shipped to Europe in 1997. The imports of GM grain encountered strong opposition from consumers and environmental groups who launched boycotts against the receivals (Trienekens & Beulens, 2001; American Radio Works, 2000).

Consumer concerns about GM's have been relayed through the supply chain and the removal of GM products by British retailers 'Tesco' and 'Carrefour' was quickly joined by big food manufacturers and fast food chains like McDonalds (Muttitt, 2000).

In 1996, a GM tomato paste product was introduced into UK supermarkets selling for 15 pence per can compared to conventional tomato paste for 18pence per can. This product was labelled as GM but still sold 18 million cans per year for three years until it was removed from the shelves due to a supermarket initiative to not sell any GM food (pers.com Tommey 2004).

Industry has responded to consumer concerns by rejecting GM foods in the EU and not conveying the benefits of GM crops to the public. If the public were aware of the benefits of the technology to farmers and the environment then the public would be more accepting (pers.com Tommey 2004). However, lack of communication and lack of trust in big multinational companies such as Monsanto and Bayer has resulted in consumers having low confidence and acceptance of GM products. In the eyes of the EU consumer, the multinationals are perceived as untrustworthy as they tried to sneak GM food onto the market. Also consumers in the EU don't trust government agencies due to their poor handling of the BSE outbreak. This leaves very few avenues in which to convey the benefits of GM crops without the consumers thinking the information is biased (pers.com Tommey 2004).

Conversely, the Internet has increased the ease of access to information. This has created two extremes and there is little information from an unbiased perspective. Tommey (2004) suggested that an independent body such as the World Health Organisation (WHO) could help dispel the anti GM sentiment if an unbiased report was published and made available to consumers throughout the world.

A recent report on consumer perceptions in the EU identified that while genetic testing for inherited diseases and the cloning of human cells and tissues is seen as useful and morally acceptable and are supported in all 15 EU states. The majority of Europeans do not support GM foods as they are judged to be risky for society. Support for GM crop is restrained as they are judged to be only moderately useful but are still seen as almost as risky as GM foods (Gaskell, Allum and Stares, 2003).

Support for GM foods is seen in four countries – Spain, Portugal, Ireland and Finland (Gaskell, Allum and Stares, 2003). The remaining EU countries - France, Italy, Greece, Denmark, Austria and Luxembourg are against the commercial release of GM crops.

5.5.3 Legislation and labelling

On 18th October 2003 the EU published two regulations on "GM and food and feed" regulation 1829/2003 for "traceability and labelling of GM organisms and the traceability of food and feed products produced from GM organisms" regulation 1830/2003. These new regulations appealed three of the four regulations currently in force. The new rules will enter force on November 7, 2003 but there is a transitional period of six months for regulation 1829/2003 and three months for regulation 1830/2003 (GAIN Report 21st October 2003).

Regulation 1829/2003 establishes labelling requirements for food which contain or consist of GM organisms (GMOs) or are produced from or contain ingredients produced from GMOs. The labelling regulations do not apply to foods containing no more than 0.9 per cent of approved GM ingredients if the presence of such materials is technically unavoidable. Operators must supply evidence to competent authorities that the appropriate steps have been taken to avoid the presence of GM material (GAIN Report 21st October 2003).

The presence in food or feed of material which contains, consists of or is produced from unapproved GMOs in a proportion no higher than 0.5 % shall not have to be labelled, provided that (European Commission, 2004);

- The presence is adventitious or technically unavoidable.

- The genetically modified material has benefited from a favourable opinion from the Community Scientific Committee(s) or the Authority before the date of application of this Regulation.

- The application for its authorisation has not been rejected in accordance with the relevant Community legislation and

- Detection methods are publicly available.

Traceability of GMO falls under regulation 1830/2003. Operators who market products produced from GMOs must ensure that the operator receives a written report indication each of the food ingredients or additives produced from GMOs and in the case of products for which no list of ingredients exists, an indication that the product is produced from GMOs (GAIN Report 21st October 2003).

Operators must have a standardised system in place to hold the information mentioned above and to allow the identification of all the different operators by whom and to who the GM foods were made available. All this information must be kept for 5 years. These requirements do not apply to products containing less than 0.9 per cent GMOs, provided that the traces of GMOs are adventitious or technically unavoidable (GAIN Report 21st October 2003). The EU will again be updating these regulation and they are due to be released on April 14, 2004.

On Wednesday February 18, 2004 the EU was deadlocked again on its lifting of its 6 year moratorium on GM foods when if rejected the proposal of importing Monsanto's roundup ready corn. The executive commission said the GM corn failed to win enough support from the committee of 15 EU countries but did come closer than its first application in December 2003 (Agbioview, February 19th 2004).

Nine of the EU countries (Belgium, Spain, France, Ireland, Netherlands, Portugal, Finland, Sweden and Britain) voted in favour of lifting the moratorium with five against (Denmark, Greece, Austria, Italy and Luxembourg) and Germany abstaining. Each countries vote is based on size so the application failed even though the majority of countries voted in favour of lifting the moratorium (Agbioview, February 19th 2004).

A positive aspect of this recent vote is that both France and Belgium, who in December voted against the lifting of the moratorium, had agreed to the lifting of the ban. In the past, both of these countries have been strong advocators of a GM free EU. A change by these countries could mean a softer stance on GM crops is slowly been developed in the EU (pers.com Tommey 2004).

Whilst Germany abstained from voting in the recent Executives commission on GM maize, on February 11, 2004 the German government approved the farming of GM crops. The approval was given as German farmers are now governed by the strictest farming rules in the EU. In order to grow GM crops German farmers must endeavour to keep contamination to zero and follow a list of good farming practices. Farmers must also take responsibility if any neighbouring organic farmers loose their right to produce organic products through contamination. Organic farmers will be able to claim compensation from GM growers under the tough new regulations (The Scientist February 18th 2004).

5.5.4 Biotech R&D investments

The European Commission has stated that in the next four years, the EU will invest at least 2 billion EURO (A$3.58 billion) in the biotechnology area, particularly in genomics and biotechnology for health. Europe has previously lagged behind the US in biotechnology research, but is catching up as new biotechnology companies are being created every year in the EU (European Union Press Releases, 25th June 2002).

In 2001, there were 1879 biotech companies in the EU, compared with 1457 in the US. The US leads the EU in terms of biotech company revenues, R&D expenses and employment; these figures are twice as high in the US as in the EU; however the growth rates of these figures are higher in the EU (European Union Press Release, 25th June 2002). This indicates that the EU is moving fast towards being a leader in the biotechnology industry.

5.5.5 Risk analyses and conclusions

The EU canola market equated to 0.4 per cent of total WA canola exports in 2002/03. There two countries in the EU who purchased WA canola in 2002/03 and these were Belgium-Luxembourg and Portugal. The Netherlands, Germany, Belgium-Luxembourg and Portugal have been the only countries within the EU who have imported canola from WA in the past 7 years.

GM's have attracted considerable amount of publicity in the EU and generally have a negative image. The public is sceptical and uncertain about the food safety concerns related to GM's. These concerns have been amplified by the recent outbreaks of BSE and foot and mouth. Consumers in the EU generally do not trust the Governments systems and regulations. Much of the public do not trust scientists and multinational companies, as they are considered unethical.

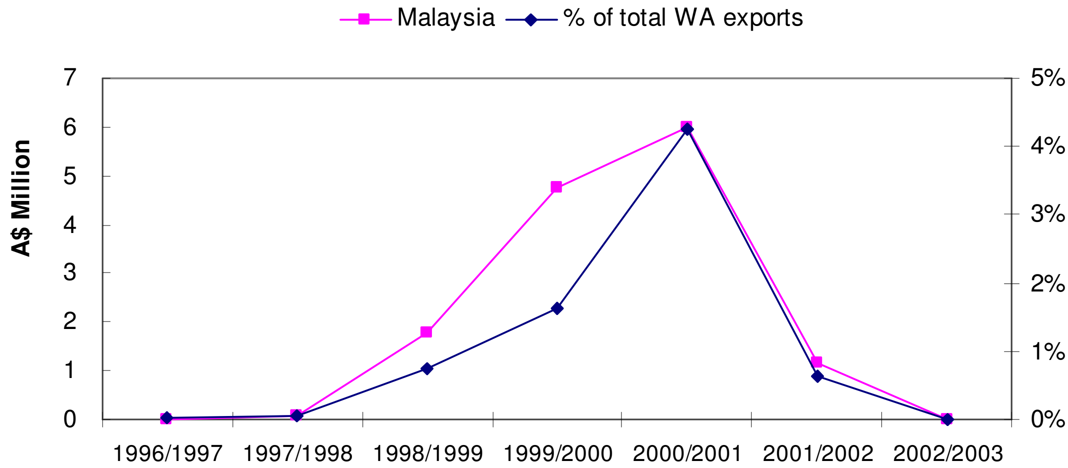
The EU is considered to be a high-risk threat to WA grain exports if the state were to introduce GM canola. However, a slowly changing attitude and the impending vote on Monsanto's GM canola variety in April 2004 could see the doors open to the importation of GM canola to the EU. If the moratorium remains in place it would be likely that exports of canola to the EU would be reduced if GM's were introduced but because the market is small the impact would be minimal.

5.6 Malaysia

5.6.1 Market overview

In 2002/03, Malaysia was WA's smallest export market for canola, importing 21 tonnes (A$10,179). Malaysia is a small but consistent buyer of canola from WA and has purchased canola for the past seven years (Figure 5.5).

Figure 5.5: WA's canola exports to Malaysia



Source: AMIC, 2004

There has been a substantial decrease in sales of WA canola to Malaysia from 2001/02 to 2002/03 but this was mainly due to drought conditions and the associated high prices for canola. Malaysia is a price sensitive market and canola imports are predominantly dictated by global oilseed prices. The majority of Malaysia consumers use palm oil as their main cooking oil due to price and accessibility and consequently canola sales are variable and opportune.

5.6.2 Market acceptance of GM

Over the past couple of years, there have been a growing number of food safety reports due to food contamination. The outbreaks have increased the level of concern and awareness of food safety along the supply chain from the consumer to the food producer.

However there is little or no public concern about GM's foods in Malaysia. With the introduction of new food labelling laws in 2003, consumer awareness could increase in the future.

5.6.3 Legislation and labelling

The Malaysian Health Ministry introduced regulations governing GM foods early in 2003. The Malaysian Government amended the Food Act and Regulations of 1985 and has made it mandatory for manufacturers and distributors to display labels on GM foods. As of April 2004, imports of GM foods require a risk assessment and approval and labelling is required on any food product when GM material is above 3 per cent by volume.

5.6.4 Biotechnology R&D investments

The Malaysian biotechnology industry has received strong government support. In 2003, the Malaysian Government officially launched its Biovalley project after three years of development. The government is allocating RM100 million (A$34.1 million) to build the infrastructure and facilities by 2006. The Biovalley will house 150-200 new biotech companies that will support biotechnology activities as well as coordinate and promote the commercialisation of research findings (Checkbiotech 23rd December 2003).

Initially, Malaysia will create three institutes for research and development in the areas of pharmaceuticals and nutraceuticals, genomics and agricultural biotechnology. When fully operational in 2009, Biovalley will comprise research, commercial, education, recreation and residential developments on an 800-hectare site (Checkbiotech 23rd December 2003).

In Malaysia GM crops have primarily been developed by public research institutes and universities. Crops under development include rice, papaya, pomelo, orchid, pineapple, oil palm, chilli, and rubber. There are no field trials of GM crops in Malaysia (ISAAA, 2002).

5.6.5 Risk Analysis and Conclusions

It is unlikely that canola exports to Malaysia would be negatively affected by the introduction of GM canola into WA due to the following reasons;

- Other variables such as the price and availability of palm oil and other substitutes such as soybeans are more important trade factors.

- With the Malaysian government heavily investing in biotechnology research and development through the establishment of the Biovalley.

- Government views on GMO seem very positive and should not hinder any imports as long as they are properly managed; and

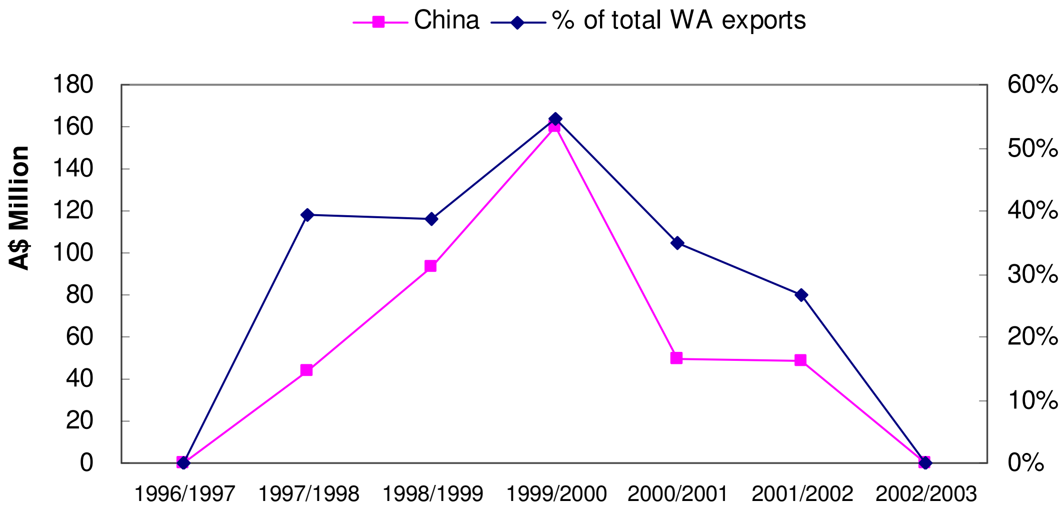
- The Malaysian consumers have a low level of concern about GM’s however some issues have arisen about the acceptability of GM crops under Islam.

5.7 China

5.7.1 Market overview

In 2002/03, China did not import any canola from WA. However in previous years, China has been a major importer of WA canola. In 1999/00, China imported 473,000 tonnes of canola with a value of A$159 million (Figure 5.6). This represented over 50 per cent of total canola exports from WA but every year thereafter, exports have declined significantly.

Figure 5.6: WA's canola exports to China



Source: AMIC, 2004

The decline of WA exports to China over the past three years was mainly due to the reduction of WA canola production and subsequent sharp price rises. The Chinese responded to the price rises by substituting canola for cheaper oilseeds such as soybeans.

5.7.2 Market acceptance of GM

To date, consumer concerns about GM products in China have been low. Prior to the GM regulation proposals in December 2001, awareness of GM products among Chinese consumers was almost non-existent (The Life Sciences Network, 2002). However public awareness of GM may increase in the future, due to the implementation of the GM import regulations in 2003.

Soybeans are likely to be the grain most affected by the Chinese GM regulations. However to date, the GM debate has not affected soybean sales from the US to China. Chinese imports of soybeans are expected to increase by 30 per cent from 10.4 million tonnes in 2001/02 to a forecasted 22 million tonnes in 2003/04 (USDA, 2004). China imported 36 per cent of its soybeans from the US, 35 per cent from Brazil and 29 per cent from Argentina from October 2002 to September 2003 (USDA 2004). Considering that over 90 per cent of the soybean imports from South America are GM and 80 per cent of soybeans from the US are GM, there has been little impact on imports to China due to the GM status of the grain.

China will ease import restrictions on GM products in view of its awareness that domestic output isn't expanding fast enough to keep pace with rapidly expanding consumption (The Life Sciences Network, 2002). China also needs the soybean imports to satisfy the rise in feed demand. This is due to the per capita income increase in China and a subsequent rise in the consumption of more meat and agricultural products (The Life Sciences Network, 2002).

Only a very small volume of soy oil in China is being promoted as non-GM soy oil and most soy oil made from GM soybeans isn't labelled as a GM product on Chinese retail shelves (The Life Sciences Network, 2002). According to China National Grain and Oils Information Centre (CNGOIC) analysts, if any Chinese consumer was asked about GM foods, they will likely return a blank look (The Life Sciences Network, 2002).

China currently has 2.3 million hectares of GM cotton under production this is equivalent to 58 per cent of total cotton production (James 2003).

5.7.3 Legislation and labelling

In December 2001, China passed new rules to regulate GM foods. Under these rules, production and imports of GM food and food additives are subject to examination and approval (1st August 2002). This requires the trading parties to obtain safety certificates, labelling permits and quarantine permits before any foreign GM grain could be brought into China. However, there was a great deal of confusion and uncertainty with the import requirements. In March 2002, the Chinese government responded to traders' request and introduced an interim agreement with the US, to allow for a 30-day approval period, so that soybean imports could continue. Under the new regulations the Quality, Supervision, Inspection and Quarantine (QSIQ) are responsible for issuing quarantine import licences (China Online, 12th August 2002).

The guidelines were to be changed further in December 2002, when a 270-day waiting period will be required for certification. The new waiting period has caused buyers to be hesitant at booking shipments. However, in late October 2002, China further postponed the strict application of new GM rules governing the imports of soybeans until September 2003 (Oilworld Monthly, 2002).

On February 23, 2004 a ruling was made by the Chinese government that approved the import of GM crops. This ruling covered five of the seven crops submitted for approval by Monsanto and included one soybean variety, two kinds of corn and two kinds of cotton. This ruling will improve the flow of grain trading between the US and China and help satisfy the growing need soy bean imports into China (Checkbiotech 24th February 2004).

Currently there is no labelling legislation for GM food. However environmental, consumer and community groups have submitted a joint petition to the Chinese government, requesting mandatory labelling.

5.7.4 Biotech R&D investments

The biotechnology industry in China has grown significantly since 1986. In 2000, the industry had sales worth 20 billion yuan (A$4.4 billion), compared with 260 million yuan in 1986 (A$57 million).

China invests heavily in plant biotechnology, with over A$200 million annually (Moore, 23rd July 2002). In early 2001, China's government officials announced plans to raise plant biotechnology research budgets by 400 per cent by 2005. If this is achieved, China could account for nearly one-third of the world's public plant biotechnology spending (Huang, et al, 2002). To date, 141 GM crops have been developed of which, 45 approved for field trials, 65 approved varieties for environmental release and 31 approved for commercialisation (Huang et al, 2002; ISAAA, 2002).

GM plants that have been commercialised in China include cotton, tomato, petunia and sweet pepper. China currently has 2.3 million hectares of GM cotton under production this is equivalent to 58 per cent of total cotton production (James 2003). Field trials are currently ongoing for GM rice, potato, soybean, cucumber, papaya, maize and tobacco (ISAAA, 2002). The Centre of Chinese Agricultural Policy in Beijing is currently working on nearly 60 crops. These activities will enable China to develop into the largest plant biotechnology capacity outside North America (Reuters, 2002).

Currently in China, there are over sixty companies manufacturing drugs produced from genetic engineering.

China leads in the development of GM rice after investing huge sums of government funds into plant biotechnology to improve national food security. It is currently conducting large-scale field trials on insect- and disease-resistant rice in the eastern coastal province of Zhejiang. However, Beijing has put off commercialisation of the GM rice due to rising safety concerns (Checkbiotech 23rd February 2004).

5.7.5 Risk analyses and conclusions

Although China did not import any canola from WA in 2002/03, it has been the second most important export market for WA canola in past years. China has been categorised as a low risk market for WA exports of canola for the following reasons:

- China's recent entry into the World Trade Organisation (WTO), has presented many opportunities for WA to further develop exports due to the decrease in the tariff levels into China. Although tariffs will be reduced in the coming years, traders will have to face other barriers such as the new GM regulations on imports. However, China's officials are assuring traders that the GM regulations are non-trade barriers and proof of this has been shown by the Chinese government ruling that five GM crop safe for importation.

- In 2003, China grew 2.8 million hectares or 4 per cent of the total global GM crop area.

- China is increasing its imports of soybeans for both animal feed and human consumption. A high percentage of the imports are GM soybeans from the US, Brazil and Argentina. The Chinese have recently ruled GM soybeans safe for importation. This will allow soybean imports to continue to increase, as there is a high demand for cheap soy products in China.

- China is also currently investing significant amounts of money into biotechnology and GM plant breeding.

- With respect to WA, the major grains exported to China are malting barley and canola for human consumption. It is unlikely that if GM canola was commercialised in WA, the Chinese market would be affected. Malaysia

5 Conclusion

The commercialisation of GM canola has been delayed in WA. However, it is important to assess the potential marketing impacts from the introduction of GM canola varieties to the state.

The majority of WA export markets are considered a low risk if GM canola was commercialised. The EU is the exception and has been classified as a high risk. If GM canola was introduced in WA, it is highly likely that the EU market would be lost which currently equates to less than one per cent of total exports. This situation may slowly change in the next couple of years as the EU has recently updated the labelling and handling legislation for GM foods. There is also a small trend towards accepting GM imports into the EU as more countries are now voting in favour of GM imports in recent sittings of the European Commission in February and March 2004.

Japan is WA's major export market for canola and at present is importing GM canola from Canada. Since introducing GM canola, Canada has experienced no loss of market share in Japan. There is a market for non-GM canola in Japan however this equates to less than 1 per cent of the total canola crush.

In WA's other major canola export market, the awareness of GM foods whilst small is increasing. As consumer awareness increases, there is the possibility that imports of GM products could be reduced. This however, seems unlikely as these markets are investing heavily in their own GM research and development programs.

Whilst there would be little impact in introducing GM canola into WA at present, the markets will continually be monitored and assessed to determine the implications for WA exports if GM canola is introduced in the future.

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