



SOYBEANS in the AUSTRALIAN and GLOBAL MARKET 2011.

An industry review and report update on Australian and global soybean production, current market situations and trends, and an analysis of the Australian industry, its potential and needs.

Report compiled by Denis M'Gee, on behalf Soy Australia Limited, April 2011.

Introduction:

The Australian soybean industry is relatively small, complex and opportunity based on global commodity markets and weather conditions. However it is a valuable summer rotation crop that is utilised in both dryland and irrigation systems and in both cereal and sugarcane farming systems. The growing areas within Australia are quite diverse and extend from the Atherton Tablelands in far north Queensland, south through both central and coastal Queensland, along the Queensland border, in the northern river valleys of the NSW north coast, all the major irrigation valleys of north western and central NSW, and further south to the intensive irrigation areas of the Murrumbidgee and Murray Rivers in southern NSW and northern Victoria. There is also a small industry based in the Ord River of Western Australia.

The industry has historically been based on oilseed crushing but in recent years has diversified into other soybean market end use opportunities, in particular human culinary applications. There have been a number of industry reviews over recent years and these documents have generally all agreed that there is a significant potential for the industry to expand. These assumptions have been based on the identified value of soybeans as a rotation crop in total farm productivity systems and from domestic and export market opportunities, in particular, the growing interest in soy foods.

The Australian National Soybean Breeding Program (jointly funded by GRDC, I&I NSW and CSIRO) have requested an update on the current industry status, a validation of recent industry surveys and a review of the industry's potential, as an information tool in their deliberations as to extending the ANSB beyond June 2012.

Soy Australia, as the commercial and industry partner, has agreed to support the ANSB with this review and to provide industry information and market intelligence. In particular this review aims to provide answers to the following questions;

1. What is the current size of the Australian soybean production and its breakdown into various market segments e.g. crushing, milk, tofu, flour etc?

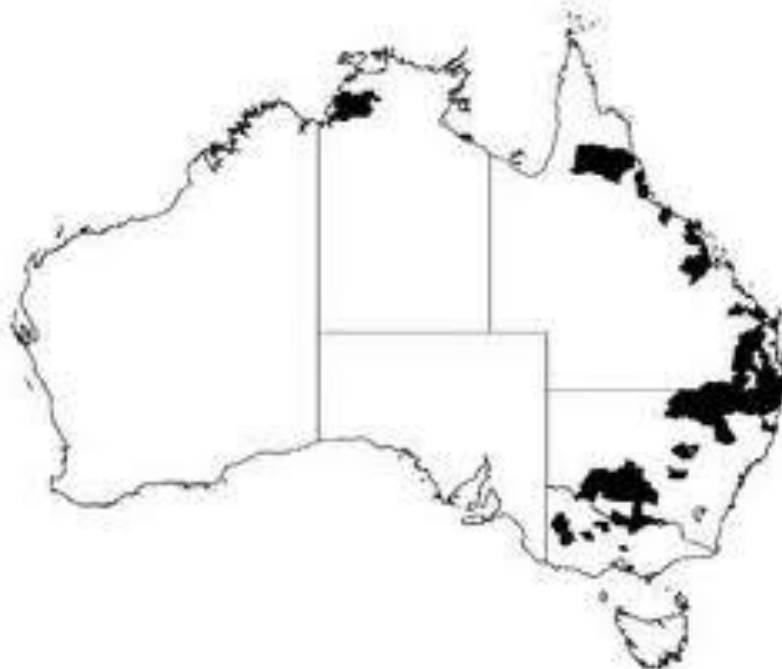
2. What are the key impediments to improved profitability to growers (this may be marketing capability, logistics, lack of value adding opportunities, agronomic support etc)?
3. What are the key drivers for, and likely location of, production expansion in Australia?
4. What is the predicted level of growth in both the domestic and the international high value culinary market over next decade?
5. What is the premium currently paid to growers for these beans domestically and for export and what is the potential?
6. What opportunities are there for increasing stability of production?

In addition, this review has attempted to provide answers to some of the other questions raised in the Terms of reference document provided to soy Australia by the ANSB.

The Australian Soybean Industry in 2011.

Soybean production is still an important to Australian farmers and is an important part of Australia's \$2.5 billion oilseed industry. The soybean industry is also a valued contributor to regional economies with businesses including input suppliers, service providers, soybean processing facilities and soy food manufacturers based in regional and urban areas. Additionally, the soybean industry also makes an important contribution to the sustainability and profitability of farming systems as a rotation crop through improving soil fertility and as a disease break.

Soybeans have been adapted across a wide area of Australia ranging from the Darling Downs and inland river valleys to the coastal hinterland and coastal sugar belt to the inland cropping regions (refer map below.) Soybeans are restricted to irrigation areas or those where there are adequate levels of summer rainfall.



Annual Soybean Production '000 tonnes (Source Australian Oilseeds Federation and Soy Australia)

	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11*
Queensland	5	32	16	15	11	21	52	16	6
NSW	9	41	38	41	21	14	48	47	30
Victoria	0	1	1	1	0	0	1	1	2
Total	14	74	54	57	32	35	101	64	38

- 02/03, 06/07 and 07/08 were drought affected years
- 10/11 value is estimate based on current Soy Australia crop forecast
- 10/11 value for Queensland is significantly down due to severe weather and flooding events at planting period. This is an estimate at time of writing.

Annual Soybean Area Planted '000 hectares (Source Australian Oilseeds Federation and soy Australia)

	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11*
Queensland	3	15	8	7	5	8	33	13	4.3
NSW	5	16	17	16	9	7	24	17	11.6
Victoria	0	1	0.5	1	0	0	0	0.3	0.6
Total	8	32	26	24	14	15	56	30.3	16.5

- 02/03, 06/07 and 07/08 were drought affected years
- 10/11 value is estimate based on current Soy Australia crop forecast
- 10/11 value for Queensland is significantly down due to severe weather and flooding events at planting period.

Soybeans have been commercially grown in Australia since the 1950's although it was not until the mid to late 1970's that the industry reached significant production levels. The industry has always been based in Queensland and NSW although small crops have been commercially grown in other states. Traditionally, the crushing sector has been the main market for soybeans in Australia. Up until the late 1990s, over 50% of the typical 80 to 100,000 tonne crop was crushed. A further 20 - 25% went into full fat soybean meal for intensive livestock feed. The human consumption market did commence to grow until the late 1970's with the influx of Asian immigration post the Vietnam War, many of which were ethnic Chinese. However, this Asian food market only accounted for around 20-30% and about 5% was retained for planting seed. There were little or no exports during the early years of the industry.

Over the last decade the industry profile has changed, with the crush and full fat sectors declining in importance, while the Asian food sector, flour milling and exports have expanded (refer table below). This shift has been driven by the higher returns from the culinary market, facilitated by the availability of new varieties that have the higher qualities that this market demands.

Despite this the crushing sector is still the basis for the industry and generally sets the market price. The crush sector also provides an important safety net and fall back for edible grade soybeans that fall short of culinary standards.

Australia is ranked as one of the world's smaller soybean producer and is generally ranked at number 30 or lower, depending on annual production. Australia's annual soybean production varies each year and is heavily influenced by the planting conditions at the critical planting windows of late spring to mid-summer. At these periods, soil moisture is critical for dryland farming decisions.

Utilisation of Australian Soybeans by Market Sector.

Market Sector	1993-94		1998/99		2003/04		2005/06		2008/09		2009/10	
	'000 tonne	% Share	'000 tonne	% Share	'000 tonne	% Share	'000 tonne	% Share	'000 tonne	% Share	'000 tonne	% Share
Flour	10.5	13	14	13	14	18.4	14	25.8	18	18	13.5	21.1
Asian	10	12.5	11	10	5	6.6	3.5	5.5	12	12	6	9.4
Milk	1.5	2	5	4.5	5	6.6	3.5	6.4	5	5	1.5	2.4
Export			5	4.5	10	13.2	4	11.1	10	10		
Crush	34	42.5	50	45	30	39.5	20	27.2	35	34.5	30	47
Full Fat	20	25	20	18	10	13.2	10	19.3	18	18	10	15.6
Planting	4	5	5.5	5	2	2.6	2	4.7	3	2.5	3	4.5
Total	80		110.5		76		57		101		64	
Imported Meal	160		200		350		400		700		800	

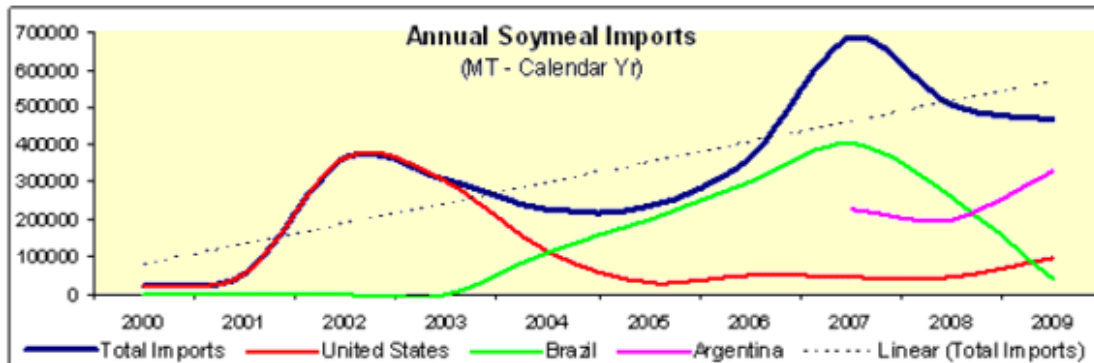
Australian Soybean Market Sectors.

Soy Milk: Australian's consume 3 litres per capita of soy milk per annum (source: Tetrapak 2009). This is a 50% increase from consumption estimates in 1998 (Ginn et al). This 2009 consumption equates to approximately 10,000 tonnes of whole soybeans. Most of the soymilk production in Australia is based on imported soy protein or soy protein isolate. The market leaders in this category are Sanitarium (valued at \$115 million) and Vitasoy (40%). Soy milk consumption in Australia is predicted to continuing steady growth. In 2010 Vitasoy invested \$18 million in its Wodonga processing facility to take advantage of this predicted growth and also it's increasing share capture of the Australian soymilk market.

Soy Flour: The Australian soy flour market is reliant on the use of soy flour in bread and bakery consumer products. The Australian baking sector is a mature market and national flour production has remained static at approximately 2 million tonnes over the past decade (source: Flour Millers council of Australia). In a similar trend, bread manufacture in Australia is approximately 800,000 tonnes per annum and the other two main sectors, biscuits and cakes, have also remained relatively static if not slightly on the decline domestically, although there has been a steady increase in the export market for these two later sectors. In general, soy flour makes up 1 -5% of bakery dough formulation. As such the domestic soy flour market is estimated at 18,000 to 20,000 tonnes per annum.

Asian Soy Foods: Australia has a strong and growing processed Asian food market, of which Asian soy foods such as tofu, edamame, soy beverages, etc. make a significant component. It is estimated that the market size has increased from 2.7 million consumers in 1993 to over 3.5 million consumers in 2008. This growth is a result of Asian migration, tourism and the spread of Asian tastes with bridging consumers in Australia. The market value for processed Asian foods has increased from an estimated \$1 billion in 1993 to \$2.4 billion in 2008. This is equivalent to an annual growth rate of over 7%. As a result of this strong market growth, the local Australian food manufacturing industry has also grown, especially for fresh and semi-perishable products. However, imports will remain the major source of supply to the Australian processed Asian foods market (source: RIRDC 2008). The shortfall for Australian soybean supply to this sector is consistency in supply and the ability to compete with imported soy products.

Australia also imports over 500,000 tonnes per annum of soybean meal to supply the intensive livestock industries as a vegetable protein source. While these imports fluctuate according to local grain supply, there has been a steady increase over the past decade as chicken and pork consumption, and subsequent production, has continued to grow.



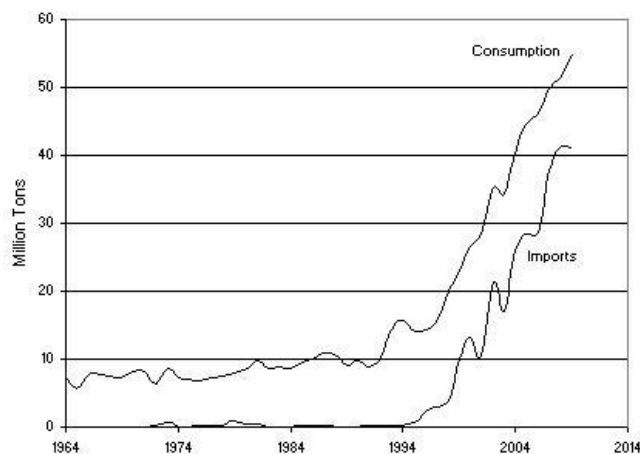
Source: World Trade Atlas data

Global Soybean Production.

The global soybean industry is one of the largest and most significant grain industries and has continued to grow significantly in recent years. Global soybean production has shown a fivefold increase in the last forty years. This growth is predicted to continue in line with increasing demand from the food, feed and fuel sectors.

The growth in food demand is a result of the rapid growth of developing world economies, particularly in Asia where population growth and increased per capita income has driven demand for both meal and oil. This is especially true in China and India, whose economies have grown 10% and 7% on average, respectively, over the last decade. China is currently importing over 54 million tonnes of soybeans and soybean products per annum.

Soybean Imports and Consumption in China, 1964-2009



Source: EPI from USDA

The vast majority (85%) of soybeans are processed into soybean meal and oil. Approximately 98% of soybean meal is further processed into animal feed, with the balance used to make soy flour and proteins. Of the oil fraction, 95% is used in edible applications, with remainder used for industrial products such as fatty acids, soaps and biodiesel

The most rapid growth has been in usage for biodiesel. This has largely been concentrated in the US where soybeans have been the primary feedstock for the biodiesel industry. This is in contrast to Europe where canola/rapeseed has been the feedstock of choice.

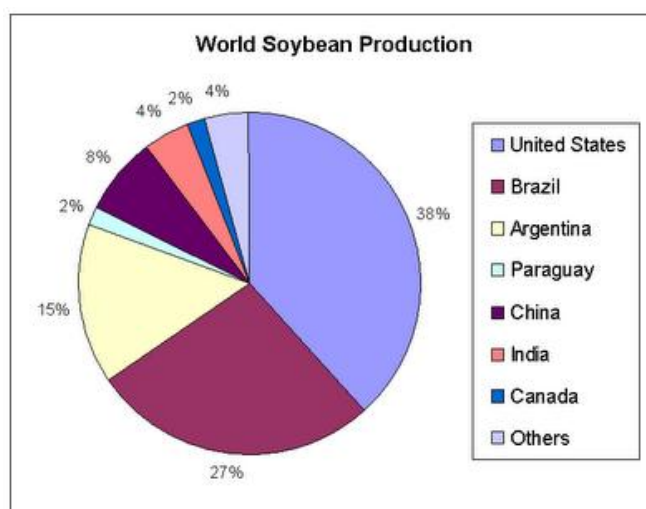
Soybean accounts for more than 50% of the world's oilseeds production. The global soybean production outlook for 2010-11 stands at 250.1 million tonnes down by around 3% from previous year's 258 million tonnes, as per USDA report. The U.S.A., Brazil and Argentina crops collectively account for more than 80% of the global soybean production.

World Soybean production & outlook for 2010-11.

Country	2008/09	2009/10	2010/11
United states	72.9	91.42	90.08
Brazil	61.0	68	72.2
Argentina	42.2	54.5	49.5
China	14.0	14.5	15.2
India	9.3	8.75	9.2
Paraguay	6.8	7.2	8.0
Canada	2.7	3.5	4.4

Source USDA, 2011

Global soybean production.



Global Consumption.

Soybeans are consumed both directly as human food products and processed into meal and oil for use in both for human food and animal feed applications.

Consumption of soybeans as a food is largely concentrated in Asia, particularly China, Japan and Indonesia, and are either used directly as a whole seed or are processed and incorporated as a high protein ingredient into food like tofu, tempeh, soy milk, soy cheese or other products. While this accounts for a relatively small percentage of the overall market (6%), it is still significant in volume terms, and particularly, value.

Global Soybean Consumption, Major Countries, 2008/09

Country	'000 Tonnes	%share
Argentina	37,208	16
Brazil	34,506	15
Canada	1,760	1
China	51,874	22
EU-27	4,880	6
India	9,645	4
Indonesia	2,068	1
Japan	4,255	2
Korea	1,602	1
Taiwan	2,340	1
Thailand	1,828	1
United States	50,305	22
Other	18,840	8
	231,111	100

Global Soybean Trade and Marketing.

Traditional soybean markets are influenced by ongoing global supply and demand forecasts for soy commodities, principally edible oils, animal feeds and industrial uses. In general human consumption soyfoods receive a slight price premium above global commodity markets.

The global commodity pricing system is heavily impacted by the size of North American and South American soybean crops and the supply: demand surplus ratio.

The other heavy influence on world commodity pricing is the increasing demand from China, which is currently importing over 1 million MT per week. This is predominantly from the US but can be diverted to South American supply by global traders as is required.

Growth in Soy Foods.

The global soyfoods business is a multi- billion dollar industry (estimated at \$US100 billion, source: Kim Cooper, 2007) comprising Asian culinary foods as a staple everyday diet through to adapted soy products that add benefit to traditional Western bakery breads, milk and margarines. These traditional soyfood consumption markets are continuing to demonstrate growth in line with population growth, health education programs and standard of living improvements in many powerful emerging economies such as China and India, where soyfoods are regarded as traditional. However, strong growth is reported in many Western populations including the USA and Europe, where acceptance of eastern diet habits is increasing and also as the health benefits of soy are increasingly adopted.

The global non- Asian soyfoods market also is growing, partly due to improvement in taste and product innovations along with a more health-focused aging consumer. The global soy food market is forecast to reach more than \$55 billion by 2015, according to Global Industry Analysts Inc.

Popularization of non Asian soy foods is mainly due to the health promoting qualities or disease prevention benefits associated with soybeans. The increase in the aged population represents a major driver for improving the growth of the soy foods market. And the aging population also influences the commercial viability of soy products and depicts an increased concern for major disorders such as heart diseases and some cancers. In addition, soy proteins are alternatively used as meat substitute that encourages aged consumers to consume soy products.

The global soy foods market is still dominated by Asia-Pacific, where soy is recognised as a staple food alternative, with sales estimated at US\$10.2 billion, as stated by Global Industry Analysts Inc. North America and Europe account for nearly 49 percent of the global soy food sales. Whole soy food market in the United States is projected to reach US\$4.4 billion by 2010.

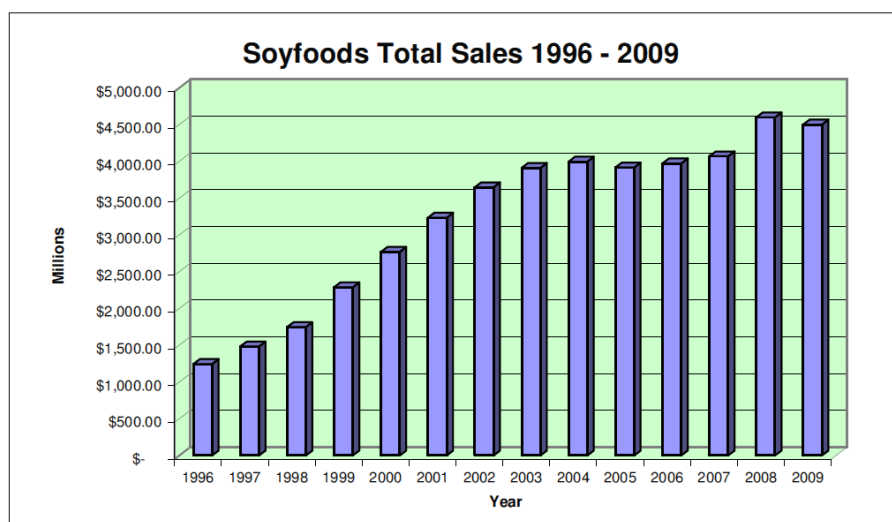
A few products catching in popularity are soy dairy products, soy snacks such as soy chips, nuts and protein bars. Rising popularity of soy snacks is attributed to the consumers' need for healthy and convenient snacks.

The rise of soy beverages and soy based fruit drinks has seen a rapid growth in the past 5 years. Volumes of soy beverages consumed in North America, Western Europe and Japan have more than doubled from 2002 to 2007, and was predicted to reach 1,900 litres and have a retail value of €5.35m by 2011. (Source: Zenith International, 2007).

Companies are increasingly turning toward soy products addressing women health. Several soy supplement manufacturers introduced unique formulations, including breakfast cereals and bars marketed as rich sources of soy protein. Consumption trends of most women in western countries have changed considerably in recent years.

Soy-foods sales in the US increased from \$300 million to nearly \$4 billion over the period from 1992 to 2007. This rapid growth has steadied somewhat in the last two years to approximately \$4.5 billion per annum in 2008 - 2010, although a slight industry growth is predicted for 2011. (Soyatech) This increase was a driven by new soy food categories, soy foods being repositioned in the market place to be more mainstream, and new customers selecting soy for health reasons. The FDA approval of a health claim linking soy with heart disease reduction was a major stimulus. More recently, growth has slowed in a range of categories.

Growth of Soyfood Sales in the USA.

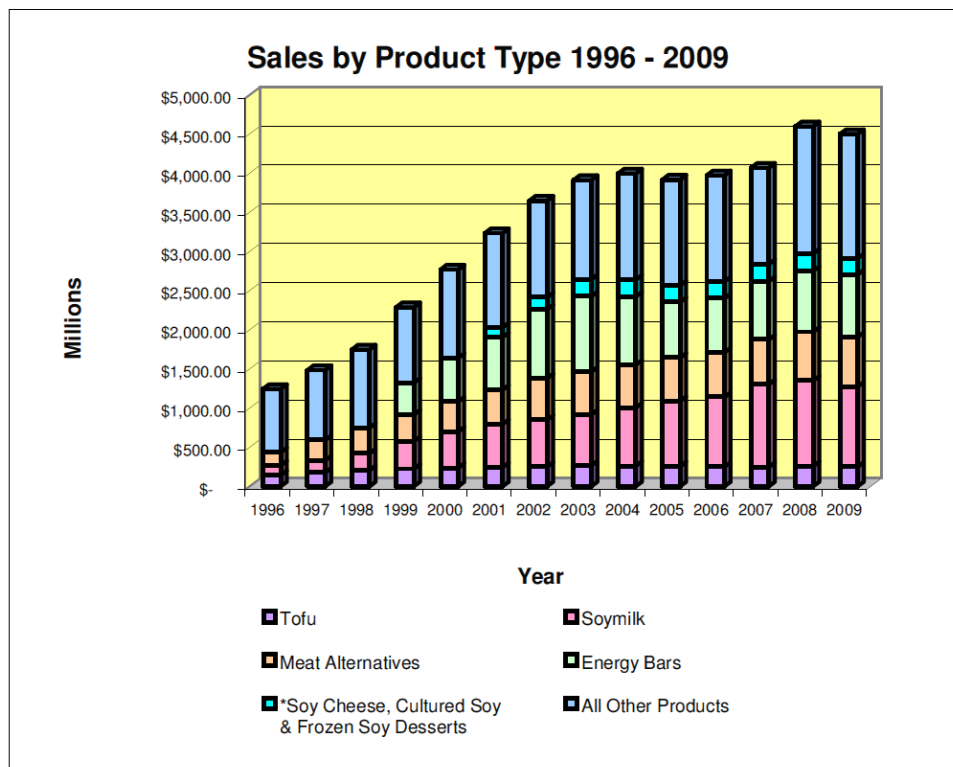


Demand for whole soybeans as direct food for human consumption is registering a healthy growth rate in Asian countries, where soybean has been a natural ingredient of daily diet for years. Western countries are also showing signs of growing acceptance toward whole soybeans as direct food beyond crushing, though historically they have been using it mainly in the crushed form, as soy protein products and soy foods. Soy Oil market in Asia-pacific is projected to register a CAGR of 7.4 percent over the period 2001-2010.

Soy milk, soy-based drinks, soy dairy free products and energy bars are showing the strongest growth. Traditional foods like tofu have seen some decline in the past couple of years.

Canadian estimates are that the retail sales of soyfoods in Canada have more than doubled from \$150 to over \$350 million in the past decade. Soy beverages lead the category with over \$106 million in retail sales. Soy energy bars account for \$69 million, followed by soy-based meat replacements at \$56 million and tofu at \$24 million. (Source: Canadian Soyfoods, 2009)

Market breakdown of USA Soyfoods.



Source: Soyfoods: The U.S. Market 2010 by Soyatech, LLC and SPINS

Soyfood Market Drivers.

Opportunities for Soyfoods.

- Health benefits – many of which have government health agency approvals worldwide
- Soy protein provides a complete amino acid profile and is of high biological quality
- The versatility of soy to produce a range of food alternatives
- The functionality of soyfoods and proteins in food production such as bakery, meat analogues, etc
- Soyfoods are relatively low cost and widely available
- Soyfoods are ecologically sustainable and environmentally friendly

- Soyfoods are animal welfare friendly

Limitations to Soyfood Consumption.

- Many consumers do not like the nutty flavour
- The texture of many soyfoods is not preferred for western diet palates
- Concerns over the anti-nutritional components of soybeans – trypsin inhibitor, isoflavones
- Consumer concerns with genetic engineering
- Perception of soyfoods as healthy, alternative

Impediments and Opportunities to Grower Profitability.

The Better Oilseeds Project commenced in 2006 with a survey of oilseed growers and advisors. This included sixty soybean growers and following is a summary of the soybean survey results.

Respondents were asked to indicate the three main factors that cause them to grow fewer soybeans than they might like to. The largest factor causing growers to plant less soybeans is price, with mentions from 61.7% of respondents overall (20% ranked as first). The availability of water was mentioned by 51.7% overall, but was the most likely to be ranked as the most important factor, at 33.3%. Other important factors mentioned by respondents were unreliable weather (26.7%), lack of available land (25%) and lack of rainfall (18.3%).

Impact on decision to grow soybeans	% 4 or 5	Average Rating
Diversify farming operation	58.8%	3.5
Profitability of subsequent crops	51.0%	3.4
Profitability of crop type	52.9%	3.3
Farming system weed control	31.4%	2.9
Agronomic support for production	29.4%	2.7
Rotating herbicide groups	27.5%	2.7
Industry support and marketing options	27.5%	2.6
Reduce risk of cereal diseases	31.4%	2.5

When asked what kinds of things would make it easier to grow soybeans, 30.5% of respondents replied that more reliable rain or earlier or more predictable break of seasons would make it easier. Improving water allocation or access to irrigation was mentioned by 23.7% of respondents, better price by 20.3% and better weed control herbicides by 15.3%.

Looking into the future, 45% of respondents wanted to grow more soybeans. Another 45% indicated they would like to keep the amount of their soybean production the same and only two respondents wanted to grow less.

About six in ten (58.3%) of respondents used triggers such as time of opening rain or grain price to determine if they plant or advise others to plant soybeans. The most common triggers used are the price of soybeans relative to other crops and the presence of sub soil moisture.

Respondents were asked what would make them consider growing more soybeans. A consistent and better price was the most commonly mentioned factor (63.3%). More stored water availability was the next most common response, at 30%; followed by more available land at 15%.

A total of 43.3% of respondents indicated some type of marketing tool that they do regularly with respect to soybeans. The most commonly mentioned tool was forward or deferred pricing contracts (21.7%).

Forty-nine respondents named sources that they use for information about growing soybeans. Of those, the most common source used is the government department of agriculture (38.8%), followed by a commercial agronomist (34.7%) and farmer groups (32.7%).

Three quarters of respondents might (43.3%) or would seriously consider (31.7%) growing or advising to grow GM soybeans.

The Australian Oilseeds Federation 2005-2010 Strategic Plan identified the following issues as barriers and limitations to soybean expansion in Australia. While several of these issues have been partly addressed, in general all are still impediments to crop expansion and profitability. In addition to these, Soy Australia has interviewed its industry members and associates to update and add to those issues and barriers previously identified.

Water availability and pricing. Soybeans require a significant amount of both soil and in crop moisture. And this is further increased for soybeans destined to the edible grades. The reliable and cost efficient provision of soil moisture, through satisfactory rain events and/or supplementation by irrigation is essential for continued soybean sustainability and expansion. Water availability is the most cited limitation by growers when deciding to grow soybeans.

Selling price of soybeans is the second most cited limitation by growers. The Australian soybean crop is still based on the world commodity price for oilseed crush grade soybeans. The soybean crush price is based on import parity for soybean meal. In turn edible grade soybean prices are pegged to the crush price. And despite the \$50-100 per tonne premium edible soybeans demand, the crushing soybean price, compared to other competition crops, limits the financial incentive for growers to plant and grow soybeans.

Gross Margin per Hectare at Different Soybean Prices and Yield.

GROSS MARGIN		Market Price (\$/t)					
(\$/ha)		\$500	\$550	\$600	\$650	\$700	\$750
Yield (t/ha)	1.5	-504	-429	-354	-279	-204	-129
	2.0	-254	-154	-54	46	146	246
	2.5	-4	121	246	371	496	621
	3.0	246	396	546	696	846	996
	3.5	496	671	846	1021	1196	1371
	4.0	746	946	1146	1346	1546	1746
	4.5	996	1221	1446	1671	1846	2121

Source: Mark Poggio, DEEDI, 2008.

In addition to pricing, marketing of soybeans, like most pulses and grain legumes, is often quoted as a major limiting factor in increasing the area of production. Despite there being a large amount of information available to growers highlighting the differences between marketing cereal grains versus pulses, including soybeans, there are still many growers that are risk adverse due to concerns as to whether a fair price will be achieved at harvest.

Soybean in the Australian context is a summer rotation crop and is grown as a part of mixed farming systems. As such there will always be a degree of competition from other agricultural industries including cotton, rice, sugar, beef and other pulse crops. In many cases the gross margin for soybeans is lower than other crop alternatives. This is combined with grower perception that soybeans are a harder crop to grow has limited the growth of soybeans in Australia compared to other soybean growing nations such as Brazil and Argentina.

Gross Margin Comparison for Dryland Summer Crop Options.

Crop	Gross Margin per ha (\$)	Gross Margin per ML water (\$)
Cotton	2255	311
Corn	1408	197
Soybean	1397	233
Sunflower	980	251
Sorghum	405	101

Source: James Quinn, CSD, 2009

In growing regions lacking sufficient infrastructure and/or further distant from end use processors, there is grower resistance to adapt the higher level of crop management required for edible grade quality, as the premium is seen as “not worth the effort”.

Poor agronomic expertise: As a minor crop the knowledge required for soybean agronomy under Australian conditions is actually quite sound. However, the combination of the regional distribution of the national crop and the effect of recent drought events limiting soybeans cropping in many of these regions, have reduced the level of soybean agronomy expertise. This in turn reduces the quality and the quantity of sources of sound soybean agronomy available to growers. This was partly addressed by the Better Oilseeds Project and will be further supported through the AOF Soybean Agronomy Training Program to be rolled out in 2011/12.

This poor level of agronomic expertise has also limited the uptake of and the effectiveness of new technology. New or inexperienced growers can, through poor or inaccurate advice, can have a poor result with their soybean crop management and so be hesitant to plant soybeans again in the future. Some examples of this include the efficient and effective use of inoculation and the use of desiccants.

As new varieties are released and as farming practices change, there are subsequent changes in agronomic practices and crop management required to achieve optimum yield and quality. As both Commonwealth and State government support for agronomic research has declined, the level of this agronomic research has also declined, and as a result a deficiency in crop knowledge has developed. This is being partly addressed by the publication of variety brochures and information sheets by Soy Australia for new varieties being released and also through the AOF Training Program.

Availability of suitable varieties. Soybeans are photogenic and have a strict day length requirement for growth. In addition, varieties with disease resistance and improved yield are also seen as limitations by growers when comparing soybeans to other summer crop alternatives.

Alternative weed management options. Due to the small size of the national crop, major chemical companies are hesitant to invest in the high registration costs to have weed control chemicals approved via the APVMA. This limitation in turn decreases the weed control options growers have

for weed control. The inclusion of sulfonyl urea tolerance in new varieties is seen as a viable option to address this limitation.

Climatic conditions in central and northern Queensland. In normal seasonal conditions, soybean harvest is during wetter conditions. This can be detrimental to grain quality, can limit paddock access for harvesting and can also increase insect damage. As such many growers are risk adverse in taking soybean crops through to harvest.

Export marketing capability: Due to the small size of the crop, the inconsistency in annual crop production, and the wide distribution of growing regions, the export market sector is small and fragmented. The smaller size on the sectors participants limits access to larger export market parcels. This has been partly addressed by the formation of Soy Australia. There is opportunity for individual export marketers to gather together under the Soy Australia banner so as to build combined export parcels.

Consistency of export surplus. The ability of the industry to gain a secure foothold in export markets has been severely hampered by the ebbs and flows in national crop production. This critical mass of production is imperative to facilitate access into Asian markets. Potential overseas customers require a consistent quantity of Australian soybeans to build confidence of quality and reliability.

Lack of export infrastructure. This is particularly an issue in the northern soybean growing areas of Queensland.

Lack of handling and storage infrastructure. Again this is a particular issue in northern Queensland. There are no large soybean storage facilities in the central and northern regions of Queensland. This, combined with the higher freight costs to ship soybeans to southern markets, has made northern growers risk adverse in taking the crop through to harvest. Up to 90% of the northern crop is not harvested and is used as a green manure cropping option. This was addressed in the Childers/Isis area in 2004/05 has been instrumental in facilitating the soybean growth in that area.

Media attitude to soyfoods. Over recent years soyfoods have received relatively negative press. This is partly in response to media campaigns by the dairy industry to counter the marketing of soy milk but there is also a general characteristic that soyfoods are only suitable for vegetarians and the inner city "latte" demographic.

The photogenic and day length flexibility attribute of soybeans limits the area of adaption for soybean varieties. This combined with the small size of the national crop, limits the availability of suitable soybean varieties across all the potential growing regions. Soy Australia has received comments from grower groups in the Buderim, Bundaberg and Northern Rivers regions for the need for more varieties with a wider and more robust planting window options and flexibility in day length requirements.

The combination of inconsistent crop size, the required regionality of varieties and the industry ability to provide a consistent amount of specified grade soybeans has forced a number of large domestic soyfood processors to turn to imported supply chain options. Several large soy milk processors are unable to purchase sufficient quantities of the required soybeans to (i) satisfy production requirements and (ii) to minimise flavour variation between varieties. As a result an undetermined amount of soy protein isolate is imported into Australia for soy milk production.

Industry Opportunities:

Variety Development: The soybean industry needs continually improved varieties with agronomic and market characteristics if it is to access the high value culinary markets and be a competitive crop option in targeted regions. The Colton Review, commissioned by GRDC, addressed the issue of whether Australia required its own breeding program or whether Australia could leverage the global investment in soybeans and simply run an evaluation program. This Review, which is still strongly supported by the industry, identified that due to the environmental differences, agronomic and quality trait targets, an Australian breeding program was necessary to the industry's success.

Agronomic Support: Through the development of accredited training programs such as the AOF Soybean Agronomy program and the other associated training programs, Mungbeans and Sunflower, develop an increased knowledge base for agronomic and crop management skills. In addition, the formation of Soy Australia has developed an expanding network of national soybean advisors to facilitate knowledge sharing and expertise. And the continuing development of the web based knowledge storage banks such as the AOF Agronomy Centre, Soy Australia and the proposed "Better Break Crop" knowledge bank as information portals to facilitate improved agronomic knowledge and skills.

Total Farm Productivity: In many regions, in particular the coastal sugar cane areas of northern NSW and Queensland, the message that soybeans have an exceptional fit as a break crop has been well proven. In these farming situations, soybeans are well recognised as providing a yield increase in subsequent cane crops (consistently 20%, source: Sugarcane Yield Decline Venture Project) and a 10% increase in total farm gross margin (GRDC 2010). While there is an opportunity to develop this concept further in other cropping areas it should be combined with the message that these benefits can be further enhanced by continuing the crop through to harvest. The Better Break Crop project has included TFP as one of its milestones.

Return on Investment: There is an opportunity to emphasise the excellent returns on investment soybeans offer. This is particularly the case with what is commonly the most limiting resource factor in summer crop production – water. If an assumption is made that 1000ML of water is available, then cropping options below can be compared:

	Cotton	Corn	Soybean	Sunflower	Sorghum
Grown area	138	140	167	256	263
Outlay	420,925	222612	175467	219878	335618
Av Yield	10.5	10.0	3.5	2.5	8.0
Return (\$)	731,909	419580	408333	471154	473584
Gross margin	310,983	196968	232867	219878	106487
ROI	1.8	1.6	2.5	2.1	1.3

The above results show there is very little difference in the risk/reward ratio (ROI) between cotton, corn and sunflower. However, soybeans provide the highest ROI when using water as limiting crop input.

Market intelligence: The industry needs to continually improve the tracking and understanding of consumption patterns, with a focus on expanding demand for the premium soy products. This is a role Soy Australia has assumed and is developing. Soy Australia provides a monthly crop forecast to

members and has recently released a weekly e-newsletter which includes market commentary both national and international.

Market Trends: There needs to be proactive involvement by the industry in directing the research effort and close relationship between industry and researchers and breeders to enable them to identify and act on market trends. Soy Australia, through its involvement in the GRDC funded joint venture Better Break Crops (AOF/Pulse Australia) aims to take on this role by liaising with the GRDC Regional Panels and the Crop Sequencing Groups.

Market Branding: While the commercial players will drive market development, this needs to be done within a national branding strategy for premium Australian food soybeans that will differentiate Australian product and generate value for growers and the value chain. Soy Australia has developed a suite of quality guidelines and systems, with the aim to promote Australian soybeans under the Soy Australia brand and logo as superior in quality and consistency.

Infrastructure: The smart investment in value adding, processing facilities and marketing activities will support the market opportunity. The value chain will become more integrated with development of closer relationships between industry and researchers and breeders. Soy Australia will work with commercial partners to optimize these infrastructure opportunities.

Export Markets: a growing demand from Japan and other Asian countries for Australian edible soybeans. Australian soybeans are positioned as a premium product and excellent prospects exist for further growth. Growth will be driven by the convergence of health, food and wellbeing, and development of functional foods. Continued success in export markets requires reliable supply, understanding of the market and soy products and development of close relationships within the value chain.

The Asian opportunity is based on values of Australian beans such as food safety record, nonGM, identity preservation, seasonality and quality. The expansion of GM elsewhere in the world has opened human consumption markets to Australia.

Countries of destination for Australian Soybean Exports (2009)

Country	Tonnes	Value	%	Av value/t
Republic of Korea	1970	1849830	33.38	\$939
Taiwan	1324	1252449	22.60	\$946
Malaysia	1590	969424	17.49	\$610
Papua New Guinea	1267	898904	16.22	\$710
Japan	323	243643	4.40	\$755
New Zealand	102	211852	3.82	\$2083
Fiji	78	59633	1.08	\$766
United Arab Emirates	44	37997	0.69	\$873
New Caledonia	7	12800	0.23	\$829
Singapore	3	4698	0.08	\$1468
TOTAL	6706	5541230	100.00	\$826

Edible Markets: The demand for edible soybeans is also underpinned by growth in western markets where there is a trend to healthier foods and increasing recognition of soy's health benefits. This

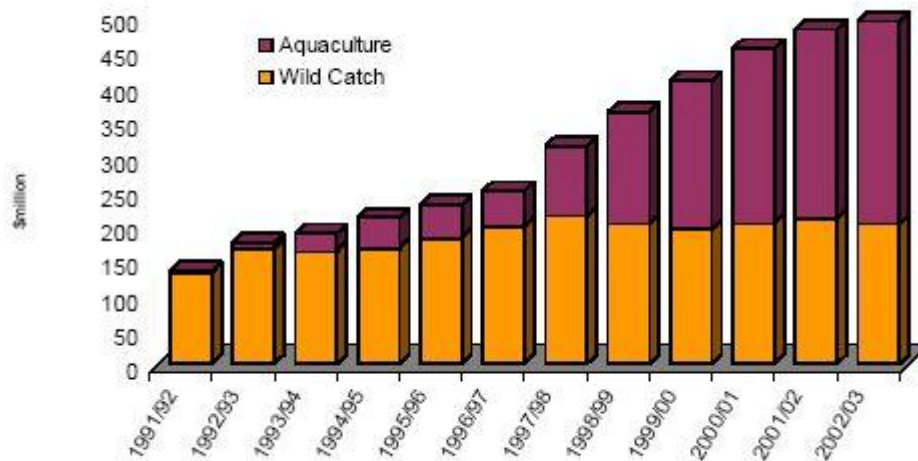
has seen soy move into the mainstream market as a food and ingredient and also generated expanding markets for value added specialty oils and healthy products.

Novel Markets: There are a number of edible soybean food products currently imported into Australia. These include frozen “Edamame” beans from China, Natto, soy sauce, soy wax for candles, soy lecithin for food processing, soybean sprouts, etc. Some of these markets could be explored and the opportunity to establish an Australian supply chain investigated. For example Soy Australia and DEEDI have co-sponsored a pilot supply chain evaluation for fresh edamame beans to be grown and process in Bundaberg and distributed in leading Asian restaurants in Sydney in 2011.

Innovative Markets: In addition to the inherent nutritional characteristics of soybeans, modern food processing techniques can be used to make further and more enhanced refinements to the nutritional and functional elements of soybeans so as to be available for a range of health and cosmetic market opportunities. These include;

- Soy protein isolates and concentrates
- Isoflavones
- Nutraceuticals
- Pharmaceuticals
- Cosmetics

Aquaculture: The FAO has predicted that for the first time, over 50% of global fish consumption will be supplied from aquaculture. To sustain this growth a suitable and sustainable source of quality protein is required for inclusion in aquaculture feeds and as a replacement for dwindling fish meal stocks. Soybean protein has the capability to replace at least 50% of the required fish meal and with further advances in diet formulation and in soybean nutrient profile; this replacement value could be increased further.

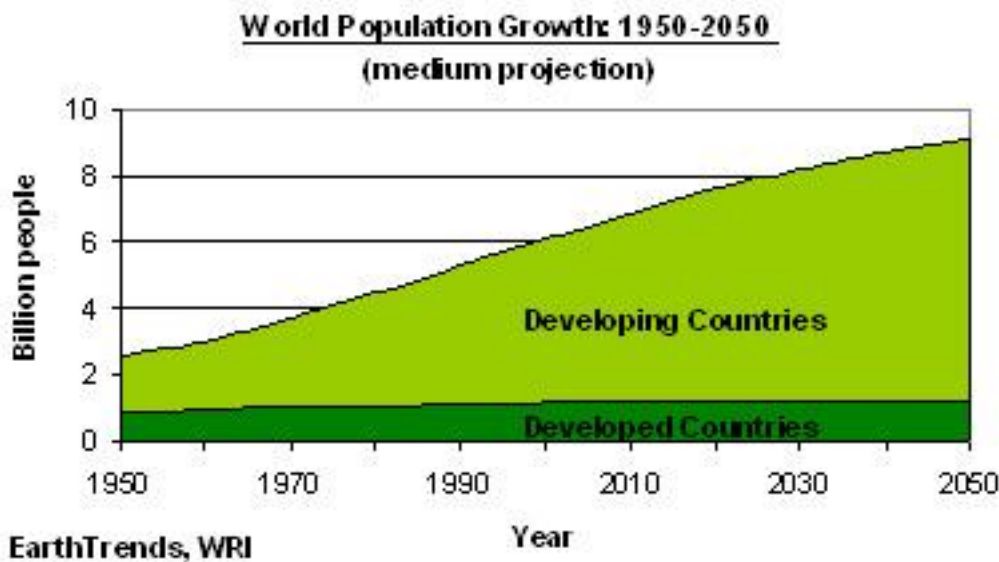


Source: Ffisa Scorecard

Industrial: Soybean oil is recognised as a superior source of methyl esters for biodiesel manufacture. The Australian biodiesel currently utilises approximately 288, 000ML of soy oil per annum, and with predicted expansion in next 5 years will utilise the equivalent of 1.3 million tonnes of soybeans per annum (source: National Biofuels, 2011).

Imported Meal: The intensive livestock industries, principally poultry and pig, provide the platform for the importation of 600,000 to 800,000 tonnes per annum of soybean meal from Argentina, Brazil and the USA. This meal importation is the equivalent of 900,000 tonnes of soybeans. While the replacement of this imported meal is not a goal of the industry at present, the existence of this market with an increase in the domestic production of culinary grade soybeans, the crush industry safety net will still be available for those soybeans that do not satisfy the grade standards.

Food Security and Sustainability: Soy products have a lower environmental impact that comparable meat and dairy products and are considered as more sustainable in terms of land use, water use and GHG emissions. Recent research showed that three times less land is required to produce 1 litre of soy milk compared to 1 litre of cow milk (Blonk, 2009). Similarly, producing 1 kilogram of meat requires six times more land than 1 kg of tofu. In terms of water consumption, this proportion rises to 8 times more water. In terms of CO₂ emissions, the same research showed that producing one litre of soymilk emits three times less GHG than one litre cow milk. This ration increases to 8 when you compare meat and tofu (source: Ecofys, 2009).



As the world population continues to rise towards 9 billion in 2050, the requirement for animal proteins will double if current demographics and habits are maintained (source: FAO 2006). It is currently estimated that 75% of agricultural land is used for livestock, be it pasture or land for fodder and crops, as a feed source. Despite the environmental impact of GHG emissions, with an increasing population and urbanisation, the efficient use of available agricultural land and water will become critical. Soybeans and other pulses can provide a more efficient, economic, sustainable and environmentally friendly source of quality protein that can easily replace or reduce the consumption of meat and dairy products

Health and Functional Foods: Global health trends are heavily influenced by an aging population in developed nations combine with a westernisation in the diets of developing nations, particularly China and India, but also other regions within South East Asia and Latin America. These health trends are seeing a rise in the incidence of obesity, diabetes, cardiovascular disease and cancer. Consumers are also becoming more aware and health conscious in the healthy eating habits as a way to “self control” and manage these health issues. Consumers will increasingly select foods which they perceive will help them treat or manage individual conditions and will promote wellbeing. The foods

included in this category are fruits, vegetables, nuts, whole grains and pulses. Soybean is well recognised globally as a sustainable source of quality protein and also been endorsed to be an aid for many health disorders.

The overall opportunity for these markets is extremely large but Soy Australia believes that an achievable and profitable consistent production level for Australia could be 200,000 tonne/year, which could easily provide the 100,000tonnes for domestic markets and provide a consistent 100,000tonnes to provide secure access to export markets in SE Asia and Oceania.

Key Drivers for Expansion.

By taking into account the following characteristics;

- Soybean is photogenic, with productivity and varietal selection highly reliant on regional day length.
- Soybeans are well recognised as a break crop in both cereal and sugar cane farming systems
- Soybeans require reliable soil moisture.

Soy Australia has identified the following regions as potential areas for expansion and where focus and resources would be of best fit and benefit.

<u>Region</u>	<u>Priority</u>	<u>Limitations</u>	<u>Opportunities</u>	<u>Resources</u>
Queensland				
Coastal North		<ol style="list-style-type: none"> 1. Infrastructure 2. Distance to markets 3. Availability of Suitable Varieties 4. Suitable weed Control Options 	<p>Develop infrastructure suitable to establish export market to SE Asia and Oceania</p> <p>Expand ANSB to include north of Bundaberg</p> <p>Continue to promote soybeans as rotation crop for sugarcane</p>	I&I NSW Soy Australia (NCOGA)
Central Highlands		<ol style="list-style-type: none"> 1. Infrastructure 2. Distance to markets 3. Competition from cotton 4. Market support 	Develop infrastructure suitable to establish export market to SE Asia and Oceania.	
Wide Bay Burnett		<ol style="list-style-type: none"> 1. Access to varieties with wider and more robust planting window 2. Sugar cane rotation benefits need further communication 	<p>Expand ANSB to include north of Bundaberg</p> <p>AOF Agronomy Training Program</p>	Soy Australia
Darling Downs		<ol style="list-style-type: none"> 1. Competition from corn & cotton 2. Available irrigation water and price 	AOF Agronomy Training Program	Soy Australia

Lockyer, Brisbane Valleys	1. Competition from other crops	AOF Agronomy Training Program	Soy Australia
<u>New South Wales</u>			
Northern Rivers	1. Access to varieties with wider and more robust planting window 2. Access to varieties with more flexibility in day length requirements	AOF Agronomy Training Program	
Namoi/Gwydir	1. Competition from cotton 2. Available irrigation water and price	Investigate soybean benefits as a rotation crop. AOF Agronomy Training Program	
Central Irrigation	2. Competition from corn & cotton 3. Available irrigation water and price		
Riverina	1. Competition from rice, corn & cotton 2. Available irrigation water and price	AOF Agronomy Training Program	I&I NSW
<u>Other</u>			
Northern Victoria	1. Competition from rice, corn & cotton 2. Available irrigation water and price		Vic DPI
Gippsland	Suitable varieties	Industry development	
Ord River WA	1. Access to viable seed 2. Access to better IPM 3. Weed control	Discussions with WA Ag to minimise the effect of required quarantine fumigation of seed germination AOF Soybean Agronomy Training	WA Ag agronomist in Kununurra
Wheat Belt	1. Suitable varieties	Industry development	WA Ag, Pulse Australia, GIWA
Tasmania	1. Suitable varieties	Industry development	

Soybean is a summer crop and competes economically against a large number of alternate summer cropping options. Whilst this process is largely commodity driven, agronomic factors play a role in influencing planting options by farmers.

Soy Australia sees our challenge to evolve our industry towards higher value uses that can differentiate Australian grown soybeans. The importance of non-commodity market development and the investigation of niche and closed loop value chains are essential in producing high value soy and soy products. This will require commercial investment in innovation technologies, infrastructure, integrated commercial partnerships and smart science.

Inevitably stable and growing industry production is largely price driven though the success of such established and well maintained value chains.

Premium for Culinary and Export Soybeans.

Current industry precedent provisions for soybeans meeting culinary or flour grades are approx \$100/tonne premium paid above the global commodity price set for manufacturing stockfeed grades. This is dependent on the grade and quality the soybeans attain.

An additional \$50-\$100 per tonne premium may also be achieved to specific very high quality grain which meets standards for milk, seed and/or other specific human consumption markets. Organic soybeans can achieve this premium. This grading and price offering process is usually set at point of sale at the discretion of trading companies acting as the intermediary for end users, processors and farmers.

This process is critical to quality assessment requiring discretionary trust and is at the direction of the trader/ grain handler as to the end result of quality assessment and price paid.

Potential is identified by all our exporters to grow our higher value food culinary markets to Japan, Korea, Taiwan and other Asian markets. Trading conditions, product quality and seasonal production volumes are critical influences on export performances year in year out.

Soy Australia is looking at alternatives to develop these markets more proactively to a scale not previously possible. The pre-purchase and storage for export to these markets requires significant financial and storage infrastructure capacities. This challenge requires new ways for industry collaboration, corporate structures and business engagement.

Breeding Program.

Due to the small size and the regional spread of the Australian soybean industry there is a definitive need for a national approach to variety development. Soy Australia and the industry strongly support this approach. At present the ANSB portfolio for variety development is aligned with the industry needs and future trends. All recent industry reviews have generally agreed that higher yield, disease tolerance, broader adaption and culinary traits are the major traits for expansion of the soybean industry.

The targeted areas of northern NSW, southern Queensland and the Riverina are all major growing areas however the largest area for industry growth is in northern Queensland as a rotation crop with

sugarcane. There may be an opportunity to expand or streamline the breeding program through either current germplasm development or the investigation of suitable overseas varieties.

However there may be a further streamlining opportunity to develop a screening process for suitable overseas varieties. Soybeans are the largest and widest oilseed crop globally and the potential of varieties grown in similar climate conditions elsewhere in the world should be explored.

The Australian soybean industry has partnership opportunities for expansion into further sugar cane rotation particularly in Queensland. This opportunity is not only hinged on the proven value of soybeans as a rotation crop but also has a nitrogen supply source. This has ecological and environmental implications for the Great Barrier Reef. The ANSB and the industry, via Soy Australia, should investigate opportunities for working partnerships with the SRDC, BSES, Queensland state government agencies such as primary industries and environment.

Soybeans were included in cotton rotations routinely during the 1990's, up to 13% (Cooper, JL. 1999). However this trend appears to have diminished in the last decade with cotton growers preferring wheat and other pulses as rotation options (Cotton CRC, 2006). There may be opportunity for the ANSB and Soy Australia to work with the Cotton Industry, through the Cotton CRC and the Australian Cotton Research institute at Narrabri to evaluate this trend and to investigate methods to reverse it so that soybeans increase in the percentage of cotton rotation crop options.

However the expansion of the industry and suitable variety development should be based on appropriate partnerships from local agencies and industry bodies. The refinement of soy as a protein source has opportunity in the expanding aquaculture industries as a fishmeal replacement in diet formulations. Again the ANSB and Soy Australia should investigate partnership opportunities with the FRDC and aquacultural agencies. There are other opportunities with bodies such as RIRDC, through its Asian Foods program and Commercialisation Australia. Development of the industry and suitable varieties for northern Victoria, Tasmania and Western Australia should be based on development of relationships with appropriate government agencies.

In addition to soyfoods, soybeans have an emerging and expanding opportunity as functional foods with a number of potential health and wellbeing benefits. This opportunity to include functional traits into new varieties in cooperation and partnership with government and national health bodies could be investigated as a further potential area for the ANSB to source industry partners. Australian research into the health and medicinal value of soybeans has virtually ceased over the past decade, despite the counter trend elsewhere globally with soybeans now being one of the widest researched health promoting foods for westernised diets.

Australia imports over 600,000 tonnes of soybean meal as a feed protein source for the intensive livestock industries every year. The growth predictions from the feed sector are that this trend will continue. In addition, the soy biodiesel market is expanding and will require a viable soy oil input. At present both these industries are based on soy imports from the USA, Argentina and Brazil. There is no distinction as to whether the soy meal or the soy oil is sourced from GM or non-Gm soybean varieties. This market, or at least a significant part of it, could be supplied domestically. This opens the opportunity to explore the variety development of suitable GM soybeans from overseas stock for the domestic crushing industry. The meal would be supplied to the livestock sector and the oil to the biodiesel sector. The Australian Oilseeds Federation has successfully developed and coordinated "Market Choice" for the introduction of Roundup Ready canola into NSW, Victoria and Western Australia. The introduction of GM soybeans for the crushing sector could be based on the Market Choice principles to ensure that customer choice for non-GM soybeans is easily maintained.

Further Information Sources.

The following web sites provide information on the global soybean industry, the development of soyfoods, opportunities for soy as a global food source and the health benefits of soy foods:

- Canadian Soybean Council. www.soybeancouncil.ca
- Solae. www.solae.com
- Soyatech. www.events.soyatech.com
- Soyfoods Council. www.thesoyfoodscouncil.com
- World Initiative for Soy in Human Health. www.wishh.org
- European Soy Manufacturers Association. www.ensa-eu.org
- Soy 20/20. www.soy2020.ca
- National soybean research Laboratory. www.nrsl.uiuc.edu
- Soyfoods Association of North America. www.soyfoods.org
- Soyfoods Canada. www.soyfoodscanada.com
- Soy Info Center. www.soyinfo.com
- The Soy Connection. www.soyconnection.com