EXECUTIVE SUMMARY

NUGRAIN believes that access to biotechnology is essential for Australian cropping industries to remain internationally competitive and that without access to this technology, the emerging gap in terms of our farm productivity vis a vis that of our competitors will widen.

NUGRAIN Limited is a joint initiative between Nufarm Limited, Australia's leading agricultural research and chemical company and GrainCorp Limited and Vicgrain Limited, two of the countries bulk grain handling companies. Nugrain has been formed to ensure that the Australian grain industry will have ready and affordable access to the benefits that will be generated from the application of biotechnology. A key platform for NUGRAIN to deliver this, is the capability to provide for collection of end point royalties.

Currently Australia is at risk of being excluded from developments in biotechnology due to the high cost of entry into biotechnology, the more favorable opportunities existing in other markets around the world (based on crop size and diversity) and the lack of an effective regulatory framework in Australia. The NUGRAIN partners felt is was essential that a commercial group within Australia positioned itself to make Australia attractive to the major biotechnology based companies around the world.

This commercial vehicle needed to allow the technology based companies access to the total Australian market, be able to collect end point royalties, deliver an effective audit program to support collection of royalties and a capability to facilitate the development of genetically modified varieties.

It is well recognised that Australia's cropping sector has maintained its position in world markets due to continual improvements in productivity. Farmer's terms of trade have been declining for decades, but Australia has continued to be competitive, largely based on the efficiency of its farmers. To keep the entire Australian grain industry profitable, there has been investment in, and application of, science to those factors that drive profitability e.g. yield, value or quality of grain and input costs.

However, our competitors continue to develop and adopt new technologies such as biotechnology and this has the potential to widen the competitive gap. Around the world plant breeding programs are seeking improvements in varieties that will provide value to farmers. Developments in biotechnology allow this to be done in a faster and more precise way, and broadens the genetic base from which genes can be drawn. For Australia, to remain competitive in productivity and product quality terms and to have the opportunity of participating in new markets, it must not be excluded from the same technologies being used by our competitors.

The rapid adoption of genetically modified varieties by farmers in the US, Canada and South America indicates that these varieties are delivering benefits to growers – either through increased productivity and/or reduced input costs.

Within the cropping sector, there is concern that the cost of seed will prohibit growers from having access to this new technology. NUGRAIN believes that it can offer a solution to this through providing the ability for collection of end point royalties.

NUGRAIN believes that end point royalties are a more universal and equitable means of capturing a return on the investment in development of genetically modified varieties and will provide a low cost entry mechanism for farmers and reduce their exposure in the event of crop failure.

It is also recognised that smaller growers can have access to new technologies restricted through difficulties in sourcing information and finance. The broad based ownership structure of NUGRAIN provides an opportunity for information to be transferred to growers through their direct linkages with NUGRAIN as owners of its partner businesses.

There are a number of issues that NUGRAIN believe need to be addressed to ensure Australia's effective participation in biotechnology. These include:

- *Management of the consumer debate* –there is a degree of consumer concern regarding the introduction of genetically modified varieties and a high demand from consumers for information in relation to these foods. Much of the consumer concern arises from lack of knowledge, misinformation and lack of confidence in the system that assesses the safety of genetically modified foods. Despite this, there is also evidence that, if the benefits are responsibly and credibly sold, consumers will accept the use of this technology as they do already for applications of biotechnology in the medical field. NUGRAIN believes there needs to be a joint Government/industry/researcher approach to the management of consumer issues;
- *An effective regulatory framework* – there needs to be an effective regulatory approach to address issues of safety for consumers, ease of introduction of technology, labeling and related issues. The lack of such a framework has both hindered the introduction of the technology and exacerbated the uneasiness of consumers. NUGRAIN believes the development of an effective regulatory framework is a high priority; and
- *Information for growers* – just as information for consumers is important, so to is information for growers in relation to issues such as the benefits and risks of the technology, market opportunities and optimal management strategies.

In summary, NUGRAIN believes that Australia's participation in biotechnology is essential to ongoing success and profitability of our cropping industries. The adoption of biotechnology will support our existing investment in crop improvement and will provide the opportunity to increase the return on the investment already made in this area. NUGRAIN believes that it offers an effective and credible mechanism for attracting the attention of the technology based companies to Australia and will provide cost effective access to this technology for growers. NUGRAIN believes that the industry, the government and research community must work together to develop efficient and credible regulatory practices and ensure that consumer concerns are managed effectively.

1.0 Introduction

Australia's ability to participate in the application of biotechnology to agriculture will be a critical factor underpinning our international competitiveness in the future. NUGRAIN provides an opportunity to promote access to the benefits of biotechnology for Australian grain growers.

NUGRAIN has been formed because its participants were concerned that Australia could be left behind in terms of access to developments in biotechnology. It was seen as essential that a commercial group within Australia positioned itself to make Australia attractive to the major technology based companies around the world.

The reasons that Australia may be left behind in global uptake of biotechnology are varied, but include:

- more favorable opportunities elsewhere for application of biotechnology, e.g. corn/soybean are more attractive crops than wheat due to crop size, purchases of seed, ability to capture return; and
- the lack of an effective regulatory framework in Australia.

The approach adopted by NUGRAIN is to ensure that Australia not only gains access to the science based elements of biotechnology (that is, access to genes, promoters and enabling technology for R&D purposes), but also the commercial capability to market the products produced i.e. the "Freedom to Operate" (legal right to grow and sell products derived from proprietary technology).

Section 2 of this submission examines the importance of biotechnology for Australian agriculture and the value of biotechnology to the sector. This section highlights the need for Australia to participate in biotechnology due to the erosion of our traditional basis of competitiveness in terms of productivity improvements and to access new market opportunities. NUGRAIN was formed as one means of ensuring Australia's participation in the biotechnology revolution.

Section 3 examines some of the issues surrounding the application of biotechnology. The issues discussed include:

- the linkages of biotechnology and existing crop improvement activities – that is – biotechnology will support and enhance traditional breeding approaches not replace them;
- the opportunity for more efficient allocation of resources from performance-based breeding and commercialisation activities;
- the benefits of biotechnology which, whilst not totally quantifiable at this stage, are expected to outweigh costs;
- cost of access for growers and the case for end point royalties as a more equitable means of capturing a return for the owners of this technology; and
- requirements for effective participation in biotechnology, including management of the consumer debate and regulatory issues.

The final Section draws together these issues and presents NUGRAIN as one mechanism for addressing the issues raised in preceding sections. This Section outlines what NUGRAIN is and the role it will play in facilitating some of the needs outlined in this submission.

2.0 The Importance of Biotechnology for Agriculture

2.1 Maintaining Australia's International Competitiveness

Australia's cropping sector has maintained its position in world markets largely on the basis of increased productivity. Farmer's terms of trade have been declining for decades, but Australia has continued to hold and increase its market share globally, largely based on the efficiency of Australian farmers.

To keep Australia's graingrowers and associated value added enterprises profitable, there has been investment in, and application of, science to those factors that drive productivity e.g. yield, value or quality of grain and input costs.

Yield has been a traditional focus of plant breeding programs, which includes both yield potential per hectare and the stability or reliability of yield under various conditions. Despite this, there is evidence that the year to year improvement in grain yields achieved by Australian plant breeders are beginning to lag behind those of plant breeders around the world and that this will increasingly impact on Australia's competitiveness in international markets.

One reason for the lack of progress in improving yield potential, may be the shift of focus to those other elements that determine farmer value – namely, grain quality and input costs and the wider adaptation of crops. This has seen breeders focus on:

- improving value of grain – the approach has been varied and has included targeting improved protein levels and composition, oil levels and composition, fibre levels and composition and malting characteristics;
- reducing the cost of inputs including development of varieties with insect resistance, herbicide tolerance and disease resistance; and
- expanding the range of environments in which crops can be grown, often resulting in expansion into areas with lower yield potential.

Evidence for this lack of progress has been presented in a number of reports over the years (e.g. Clements et al[1], Hamblin[2]), however, this needs to be considered in the context of implications of the issues discussed above and what yield levels would be if there had not been a plant breeding effort.

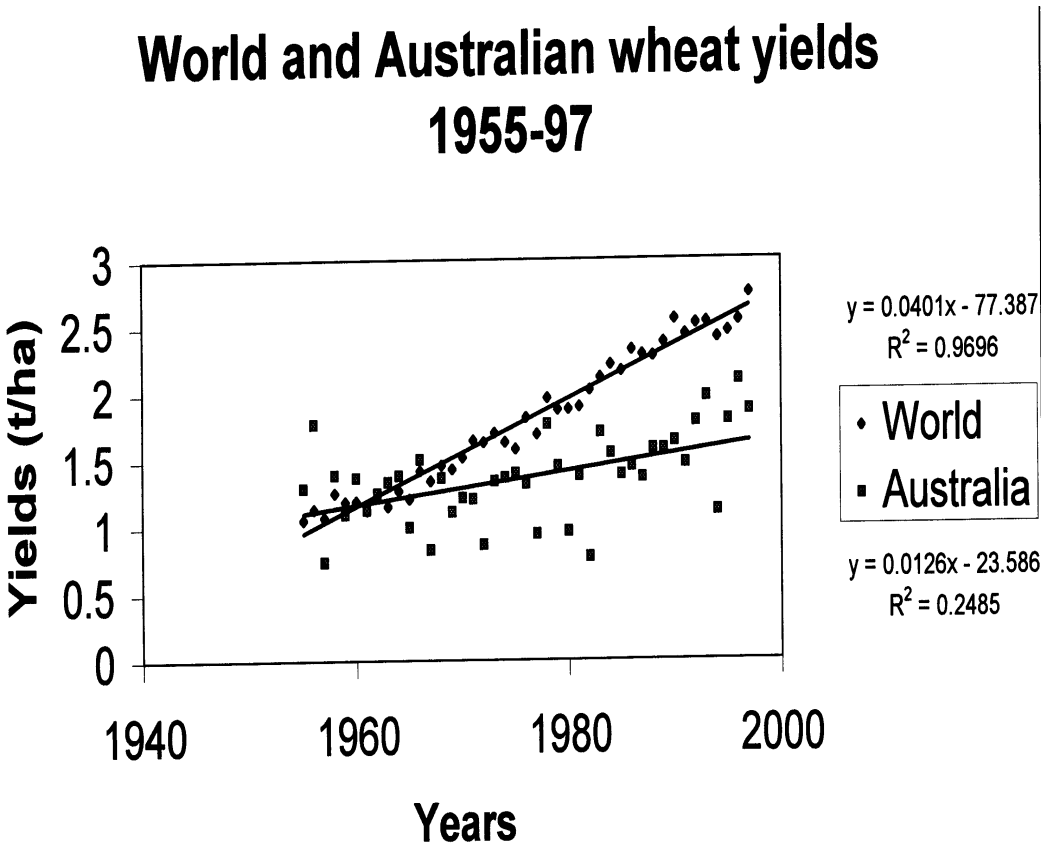
The key issue for Australia is whether Australia's technology and crop improvement progress has kept pace with its competitors. It is commonly believed that this is not the case and that the rate of genetic improvement of cereal grain yields in Australia is low by the standards of other developed countries. Figure 1 illustrates the widening between Australia's average yields and those of our competitors.

The Clements report showed a similar trend, finding that for Australian wheat yields, the average improvement between 1936 and 1968 was about 16.6 kg/ha/yr (about 2.1% per year), whilst the rate for the US was 29.8 kg/ha/yr (or 3.4% per year). Between 1965/67 and 1985/87, Australia's average improvement in wheat yield was estimated to be 1.2% per year. Other estimates of genetic gain in several states over the period 1884-1982 range from 2.4 – 7.2 kg/ha/yr (much less than 1% per year).

This report also pointed to an even lower rate of genetic yield improvement (0.3-0.5%) for grain sorghum in Australia and concluded it was likely that low rates of genetic gain would also be found for other cereal grains such as barley and oats.

Footnote: [1]Clements/Rosielle/Hilton - GRDC report on Future of Plant Breeding 1991
[2]Hamblin - Presentation to Grains Council of Australia 1999 (Perth, WA)

Figure 1



Source: [2]Hamblin - Presentation to Grains Council of Australia 1999 (Perth, WA)

2.2 Using Biotechnology to Enhance Traditional Breeding Practices and Improve Australia's Competitiveness

The profit drivers for farmers – yield, quality and input costs – that are targeted by traditional breeding programs, are also the focus of improvement through biotechnology. Thus, the techniques of traditional plant breeding, molecular assisted breeding and biotechnology are all aimed at achieving the same outcomes, but have different potential timeframes for achieving results.

Traditional breeding programs use cross-fertilization of genetically-different plants within a given species to produce improved varieties, e.g. crossing a high-yielding corn variety with another that is tolerant to drought. The problem with this method is that there is a high probability of transferring undesirable genes at the same time as desirable ones. The presence of many undesirable genes is not always detectable immediately, and shows itself only later under certain conditions. With traditional breeding methods, time, patience and skill are required to produce a desirable new plant.

Traditional Plant breeding is about:

- determining the traits to be improved, e.g. yield, disease resistance, grain quality;
- establishing methodology to measure progress towards achieving these objectives;
- crossing and selecting a range of parental lines exhibiting these traits alone or in combination; and
- continuing this process for many generations until the new variety exhibits the desired characteristics.

The elapsed time from first cross to variety release is generally around 8 to 12 years.

Molecular assisted plant breeding is an adjunct to traditional plant breeding and uses DNA markers known to be associated with specific traits e.g. disease resistance, grain quality. DNA markers enable assessment of these traits at a very early stage, e.g. seed or seedling. This approach generally speeds up progress and increases precision and predictability. Elapsed time from first cross to variety release can be reduced to 4 to 8 years.

Biotechnology is simply an extension of plant breeding. Plant improvement through selective breeding and hybridization has been practiced for centuries. Traditional plant breeding involves crossing 1,000s of genes and is a lengthy and imprecise process. By contrast, biotechnology is focused on a small number of genes which are transferred directly into a commercial variety and, as such, is a more rapid and precise process.

Biotechnology can lead to unique products as plant characteristics of commercial and agronomic value are determined by genes. Often characteristics of value reside with one species and not with another. With biotechnology the source of genes is not limited to plants. Biotechnology allows beneficial genes to be isolated from any source and transferred to the crop of interest.

Biotechnology is a new and important tool for plant breeders, but needs to be integrated with traditional breeding approaches. Classical selection methods are still appropriate, but biotechnology can considerably enhance the scope of the plant breeder's task.

As discussed in Section 2.3, the potential benefits of biotechnology will be captured by farmers through its impact on the key drivers of profitability: yield, value of grain and input costs. The rest of the community also stands to benefit both directly and indirectly.

For example, the food industry will get access to:

- products with improved nutritional characteristics e.g. wheat with improved essential characteristics;
- products with improved processing qualities e.g. barley with better malting qualities;
- lower incidence of chemical residues due to reduced use of chemicals to control insects and other pests; and
- new food processes— using food production processes which are more efficient, more productive and more environmentally-friendly;

For the consumers, potential benefits of biotechnology are likely to be:

- improved nutritional quality of food;
- improved security of supply - varieties better adapted to developing countries' needs;
- improved product qualities such as shelf life, consistency, and health properties (e.g. food designed to protect against certain cancers or disease);
- greater range of food products with different characteristics such as "nutriceuticals" with enhanced nutrient value; and
- foods with novel protective agents, antibodies, or vaccines.

The application of biotechnology is also expected to have a positive impact on the environment. This may be via a wide range of impacts including reduced use of pesticides and herbicides through the development of plant varieties with increased resistance to diseases and pests, and tolerance towards herbicides with less environmental impact; less soil degradation by wider use of no-till farming and increased use of raw materials to produce biodegradable products.

2.3 Value and Importance of GM Varieties

A feature of many new technologies is often the long time lag between their initial emergence and their measurable impact. It is not yet possible to demonstrate, in all cases, measurable impacts of biotechnology on either human health or agriculture in terms of broad indicators for health (such as life expectancy, reduced incidence of certain diseases) or agriculture (productivity). However, improved farmer gross margins following adoption of genetically modified varieties are now well defined in the US and Canada.

Whilst the early projections of gains from and impact of biotechnology were overly enthusiastic, significant application began to occur by the mid-1990s. The first commercially successful virus resistant crop, a virus resistant tobacco, was introduced in China in the early 1990s. The Calgene Flavr Savr™ tomato, the first genetically altered whole food product to be commercially marketed, was introduced in 1994. Since then, significant progress has been evident in transgenic approaches to the development of herbicide, insect, and disease resistance in a number of crops. By the 1998 crop year, an estimated 28 million hectares had been planted worldwide to transgenic crops, primarily herbicide or virus resistant soybeans, corn, canola and cotton.

Application of biotechnology to agriculture will create value through:

i. improving on-farm profitability through increased productivity, improved product value and reduced input costs – i.e. improved input traits e.g. herbicide tolerance, insect resistance, disease resistance, nutrient uptake;

ii. making available value-added and proprietary products to command premium prices – i.e. improved consumer traits e.g. protein, starch or oil quality, post harvest behavior, nutriceuticals; and

iii. expanding the production base of agriculture through new traits that expand production areas/performance (i.e. performance traits e.g. drought and salinity tolerance) and/or expand existing markets or create new markets (i.e. market traits to develop functional foods, pharmaceuticals, animal health and/or industrial feed stocks).

The traits that have been commercialised to date, and are likely to dominate in the short to medium term, are input and consumer traits. Consumer traits have not been widely evident in the broadacre cropping industries, but are likely to be seen in the short term with modified oil composition in oilseeds. These products will determine the long term strategic position of companies, generate short term cash flow, enhance current market position and provide the platform for future products. As such, it is important that Australia has the opportunity to participate in these early stages of biotechnology application.

However, it is development of varieties based around performance traits that will determine the ultimate value creation of biotechnology and have the greatest impact on improvement of yield potential and competitiveness for Australia.

The potential value to the farm sector from the genetically modified varieties already released is demonstrated in the rapid uptake of these varieties in the US and Canada (a growth factor of 2.5 between 1997 and 1998). It is expected that a similar adoption rate would be experienced here, if similar productivity improvements were realised by Australian farmers.

The adoption of genetically modified varieties is shown in Tables 1 and 2.

Table 1: Global Area of Transgenic Crops in 1997 and 1998 by Crop

	Area Planted (million hectares)				Factor Increase (1998 / 1997)
	1995	1996	1997	1998	
Soybean	-	1.25	5.1	14.5	2.8
US	-	*1.0*	*9*	*25.0*	
Canada	-	-	*0.006*	*0.18*	
Argentina	-	*0.25*	*3.75*	*10.0*	
Corn	-	-	3.2	8.4	2.6
US	-	-	*2.5*	*10*	
Cotton	-	1.875	1.4	2.5	1.8
US	-	*1.8*	*3.2*	*7*	
Australia	-	*0.075*	*0.15*	*0.2*	
Canola (Canada)	-	0.05	1.2	2.4	2.0
Potato	0.1	0.9015	<0.1	<0.1	N/A
US	*0.1*	*0.9*	*0.025*	*0.04*	
Canada	-	0.0015	0.005	0.014	
Total	*0.1*	*4.1*	*11.0*	*27.8*	*2.5*

Table 2: Global Area of Transgenic Crops in 1997 and 1998 by Trait (million hectares)

Trait	**1997**	**1998**	**Factor Increase (1998 / 1997)**
Herbicide tolerance	6.9	19.8	2.9
Insect resistance	4.0	7.7	1.9
Insect resistance & Herbicide tolerance	<0.1	0.3	N/A
Quality Traits	<0.1	<0.1	N/A
Total	11.0	27.8	2.5

3.0 Implications for the Grains Industry of Biotechnology

This section addresses issues for the grains industry in relation to biotechnology and which are mirrored by the issues raised in the House of Representatives Inquiry Issues Paper.

3.1 Ability for Producers to Compete using Traditionally Available Varieties

The Australian agriculture industry today tends to be characterised by production and marketing of undifferentiated commodity products, despite a range of Government and industry initiatives to create a market driven sector. As such, market selection tends to be supply driven, with Australia in general, and broadacre crops in particular, tending to be a price taker.

As previously highlighted, there has been a dependence on continued improvement in productivity to maintain Australia's competitiveness in these commodity markets. This competitiveness is being threatened by the lack of improvement in yields occurring within key agricultural sectors such as grains, particularly compared to that being achieved by our competitors.

There has been recognition over the last decade of the need to develop a more market focused culture and to develop premium and branded products. This has

been promoted by the Federal Government through strategies implemented by Supermarket to Asia and previously by the Agrifood Council, with similar initiatives occurring at state level. This has seen a focus by plant breeding and R&D institutions on quality traits, however, there has been limited success in this area and often at the expense of further yield increases.

It is expected that this strategy will continue to be pursued and that there will continue to be more emphasis on customized and proprietary products. This is likely to result in:

- production decisions being shifted from farmer to end-users;
- stringent product specifications and quality control;
- an increase in contractual production; and
- development of structures to directly link farmers to end users to ensure supply and quality.

If farmers are to respond effectively to the demands that will be placed on them over the coming decades, research in molecular biology and biotechnology will have to be directed to removing the physiological constraints to crop yields.

The biotechnology products that are presently on the market are almost entirely designed to enable producers to achieve yields that are closer to present yield potential and/or lower costs of production. Subsequent developments will see products designed to improve the value of crops and to improve the yield potential of crops. However, if Australian farmers are to gain access to the benefits of this technology, it is essential that relationships and commercial linkages are established with major international players in the early stages of the technology development.

The agricultural industry is in the midst of major change, with the pace of change increasing. This change has impacted on issues such as product characteristics and consumption patterns; and size and location of production enterprises. As a consequence the production sector is experiencing a move towards the emergence of larger farms that have enhanced linkages through the production and distribution chain. This change is not just occurring in the farm sector, but there is an increasing emphasis being placed on managing and optimizing the food supply chain from breeding to the end-user/consumer. Biotechnology, because of its ability to develop proprietary and unique products, is one of the tools that will determine where value is created through the food chain.

NUGRAIN will help to strengthen the linkages between new knowledge (intellectual property)/ technology and commercialisation/distribution to the farm sector, with the aim of improving the profitability and international competitiveness of the sector.

3.2 Commercialisation and Marketing of Varieties

Some sectors of the community believe that the cost of access to genetically modified varieties will be prohibitive for growers and thus, negate the advantages that may accrue from this technology. This perception arises from the recognition that the major developers of the technology around the world will seek to capture a return on their investment. A major source of revenue from genetically modified varieties will be captured through the seed as opposed to other inputs and thus, the mechanism by which this value is captured is critical in determining cost and access for growers.

A characteristic of broadacre farming in Australia is the large proportion of seed used being 'farmer saved' seed. This makes a royalty on seed unattractive for the

owners of technology and inequitable for farmers who are early adopters of the technology. It is estimated that around 800,000 tonnes of seed is used by the cropping sector annually, with seed purchases by the grain and grain-sheep/beef sectors only $80 million in 1994/95.

Seed is a major input into the farming sector and whilst the gains from productivity and value improvements are expected to outweigh the costs of genetically modified seed, it is important that costs of entry into these varieties provide access for all producers.

Currently, the return from new proprietary varieties is generally captured through a royalty on seed. NUGRAIN believes that a more cost effective and fairer mechanism for capturing a return on the investment in genetically modified varieties is end point royalties. An end point royalty system will ensure that returns are captured from all farmers who use the genetically modified varieties even if farmer saved seed is used. Furthermore, the cost is incurred after the value has been captured by growers. The end point royalty system will significantly reduce the cost of entry and improve access for growers to this technology and, in the event of crop failure, farmers are not liable for the additional cost.

The use of end point royalties to capture value from biotechnology application is an underpinning philosophy of NUGRAIN. The NUGRAIN alliance provides a mechanism for collecting and distributing end point royalties.

3.3 Appropriateness of Regulatory Arrangements

Australia's participation in biotechnology and the consumer perceptions of such products has been hindered by the lack of a clear and consistent regulatory framework. The development of an adequate regulatory framework will impact on Australia's competitiveness.

The regulatory approaches in the US and Canada represent a substantial comparative advantage over other countries in terms of establishing and maintaining a lead in the application of gene technologies due to their highly successful role in allaying public concerns over the safety of GMOs.

NUGRAIN supports the regulation of gene technology so as to:

- provide suitable safeguards;
- encourage public confidence through access to meaningful information from appropriate 'public consultation mechanisms; and
- allow development and application of the technology for the benefit of Australian agriculture.

The recent announcement by the Federal Government for a Gene Technology Office is a step in the right direction. The necessary requirements of a regulatory system that will facilitate the smooth application of the technology to the Australian agricultural sector are that it is:

- credible and attracts public confidence;
- based on sound scientific assessment principles;
- encourages rather discourages technological innovation and industry investment;
- consistent with international regulatory systems, particularly those of our major trading partners or competitors; and

- consistent with Australia's international obligations, in particular, those relating to WTO.

As such, the industry requires a clearly defined regulatory framework for gene technology that will allow businesses like NUGRAIN to forward plan and invest with confidence.

3.4 Consumer Issues Relating to Genetically Modified Organisms

The consumer debate has the potential to delay the introduction of genetically modified varieties and the lack of a rigorous regulatory system will cause unnecessary uncertainty over the status of certain products.

The issue of gene technology is complex and it is very important that the debate is managed in a way that provides consumers with meaningful and accurate information that can allow them to make informed opinions on the benefits or otherwise of genetically modified varieties.

There is currently in Australia, as elsewhere in the world, a feeling amongst the average consumer that the application of this technology is somewhat out of their control. This feeling is created by statements such as:

- up to 60% of products in the supermarket contain soy-derivatives;
- segregation and labeling are impossible, so free choice is also out of the question;
- that the genetically modified products offer no consumer benefits at all, not even in terms of lower price;
- that herbicide resistance means that the farmer can now spray herbicide at will; and
- insect resistant varieties will lead to an 'arms race' with insect populations.

Further, the association of genetic "manipulation" in the media with scary transgenic animals and 'Frankenstein food', loss of biodiversity, plants overrunning the earth as in science fiction stories has all added to the uncertainty in the minds of consumers.

Factors that will help promote consumer acceptance are:

- **Safety** - There must be no doubt whatsoever left in the consumers mind that GM foods are safe to eat. This requires an adequate regulatory system to ensure the 'safety' of products has been assured and a joint responsibility of government and scientists to communicate this to consumers. Standardisation of safety approvals worldwide would assist to build consumer confidence.
- **Responsible Behavior** – Companies involved in all aspects of the food chain must be seen to behave in a truly responsible manner, particularly in conserving the natural environment. A long-term commitment to sustainability is critical to building trust and credibility with consumers.
- **Consumer Benefits** – Effective communication of the nutritional and/or environmental benefits of genetically modified foods is required. Consumers tend to have negative perceptions of genetically modified foods, but no similar problems where biotech is applied in the medical area to develop new and effective drugs and the benefits are recognised Both products are developed with essentially the same technology.
- **Information Sources** – Sources of information trusted by consumers should be used to promote the safety and benefits of genetically modified foods. Experience shows that key opinion formers, for instance trusted scientists or public figures, can reassure the public, make them feel more in control. Research has

shown that the public wants information on genetically modified foods so they can make up their own minds. Information on all production aspects, for instance environmental effects, should to be readily available to everybody in the supply chain and the message must be kept simple. For example, the herbicide resistance principle is very difficult to explain, but the public does understand environmental benefits in general and is reassured when serious environmental groups endorse claims.

There is clearly a joint role for Government, the science community and commercial players to work together to bridge the credibility gap with consumers. This will only be achieved by sustained, consistent and responsible behavior and by sharing the task. NUGRAIN sees it has a role to play in providing reliable and credible information.

4.0 Nugrain – A Solution for the Australian Cropping Sector

NUGRAIN Limited is a joint initiative of GrainCorp Limited and Vicgrain Limited, two of the country's principal grain handling organisations and Nufarm Limited, Australia's leading agricultural chemical company.

NUGRAIN has a strong technology transfer role providing an integrated system for funding and delivering intellectual property to the Australian agricultural sector. Its aims are to:

- utilise its strong commercial based relationships with global science/technology based companies to access leading technology and intellectual property for the Australian agricultural industries; and
- utilise its commercial relationships within the value chain for the Australian broadacre cropping sector to ensure effective transformation and commercialisation of this technology.
- NUGRAIN is Australian owned and represents over 40,000 grain growers. This ensures that NUGRAIN is focused on enhancing the international competitiveness of Australia's grain growers

NUGRAIN has captured the support of leading international biotechnology companies because it:

- has access to the Australian market;
- has the ability to provide identity preserved pathways for harvested grain;
- posses the infrastructure to collect end point royalties and to ensure regulatory compliance;
- can facilitate rapid transfer of technology to locally adapted germplasm; and
- is a credible, experienced and Australian owned organisation.

NUGRAIN strongly supports the use of endpoint royalties as a mechanism to deliver return to the owners of the technology and varieties as this will reduce the cost of access for Australian growers and be a more equitable means of delivering the technology to growers. to capture value and provide a return to the investors in this technology.

The ownership structure of NUGRAIN provides an opportunity for information to be transferred to growers through their ownership of the NUGRAIN partner businesses. Access to information and finance are often limiting factors for smaller growers in adopting new technologies.

NUGRAIN will play a joint role with the Government and the research community in ensuring there is credible and reliable information provided to consumers, which is critical to the successful introduction of this technology.

In summary, NUGRAIN believes that Australia's participation in biotechnology is essential to the ongoing profitability of our cropping industries. The adoption of biotechnology will be integral to crop improvement and will provide the opportunity to increase the return on the investment already made in this area. NUGRAIN offers an effective and credible mechanism for attracting the attention of the technology based companies to Australia and will provide a cost effective access to this technology for growers. NUGRAIN believes that the industry, the government and research community must work together to develop efficient and credible regulatory practices and ensure that consumer concerns are managed effectively.