THE WINSTON CHURCHILL MEMORIAL TRUST

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“If we ignore the facts contained in one part of the world, surely we are hampering scientific advance”

Sir Douglas Mawson 1882-1958

Gaining a better understanding of cotton production and the community’s perception towards Genetically Modified crops within the European Union and the United States of America.

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Signed Dated
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1. Precis and Acknowledgments

This report details the findings from a 2002 Swire Group Cotton Churchill Fellowship visit to Belgium, Switzerland, Spain, Greece, England, as well as the States of Missouri, Mississippi, Arkansas, Illinois, Tennessee of the United States of America. All the information gathered is from an industry point of view. The study makes particular reference areas of study including;

- Variations in cultural difference and how this has contributed to differing community attitudes towards GMO’s
- Understanding the social usefulness of farming within European Union and the United States.
- Understanding of agronomic and economic practises and the environments in which cotton is grown within European Union and the United States. To assist in explaining the lack of necessity or want of transgenic cotton and how this differs from Australia.
- Understanding of the subsidy systems in place within the European Union and the United States and how alterations to farming practises such as the inclusion of Genetic cotton crop varieties would disrupt this system, socially and economically.
- Learning of supply companies options of the global community’s adoption and acceptance of Genetically Modified foods and fibres.

My enlightening experience throughout Europe and the United States would not have been possible without;

- The opportunity and financial support from the Winston Churchill Memorial Trust and the Swire Group. I am humbled by the honour to represent such an organisation, and to meet with the Swire’s themselves.
- The support and commitment of Wesfarmers Landmark for providing assistance where ever required. And especially to the Narrabri branch team for their generous support, for as I travelled through a European summer, they stayed and covered for me in a depressing drought, yet always stayed cheerful.
- Dr Tim Drew, and Dr Ralph Shulze for their insightful assistance in helping me with my proposal and for sharing and introducing me to their contacts around the world.
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- Syngenta, Bayer, Monsanto, the University of Arkansas and Delta & Pineland International for their astounding hospitality and willingness to share information.
- Mr. Ken and Sue Flower for adopting me into their home.
• Dr Anastasia Populous and Dr Jesus Rossi for their overwhelming hospitality and for translating for me.

• My parents and brothers Wendy, Paul, Nicholas & Tim and to Kylie for their love, support, understanding and their blinded faith in me, with them my dreams became realities.
2. Executive Summary

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Fellowship objective
To gain a better understanding of cotton production in Europe and the United States, and
the community’s perception towards Genetically Modified Organisms and the long-
term implications it may have on the Australian Cotton Industry.

Fellowship highlights
1. **Syngenta Headquarters Basel, and research institute Stein** – meetings with
Head Global Licensing in Biotechnology Mr Bruce Lee. Interview with various
managers of public relations, litigation, marketing, biotechnology & cotton.
Tour of Stein research institute and greenhouses, as well as interviews with Dr. Hubert Buholzer and other experts and scientists of biotechnology and chemistry
within the facility.

2. **Delta & Pineland Seville** – With the assistance from Jesus Rossi – a tour of
Delta & Pineland trial sites, meetings with farm managers on pest control and
agronomic practices. Interview with an adviser to the European Union
Government on cotton subsidy allocation and budgets.

3. **Institute of Biotechnology and Inscription Institute Thessaloniki** – Interview
with Inscriptions officer Mr. Baster and the process of quarantine and quality
control a new variety from overseas for permits of production within Greece.

4. **Tsiqlacoulis farm visit and day as a Greek cotton agronomist** – farm visit and
tour of the Tsiqlacoulis large family farm. A day with Mr. Harilos Rodis an
agronomist, chemical reseller and consultant working for a cooperative of cotton
growers in small villages around Larisa.

5. **AKKAS one of the largest cotton gins in Greece** – Interview with Mr. Fokion
Georgiadis, translating by Dr Anastasia Populopoulos on how the cotton is ginned
within Greece. The quality of cotton within Greece, the target market for their
produce and how the subsidy on cotton is distributed to the grower through the
gin.

7. **Monsanto Headquarter of St Louis, the Chesterfield Research facility of Monsanto** – Interviews with Dr. Andrew Reed Manager of Regulatory Affairs, Director for international public affairs Mr. Gary Barton & Research manager of cotton Mr. Mark Oppenhuizen. A guided tour of the Chesterfield Research facility which possesses a 11/2 acre greenhouse on the roof of the facility.

8. **Greenville & Leland Mississippi** - Visits to Bayer farm research facility and viewing of Fibre Max varieties conventional and transgenic with Mr. Jefferson Gwyn. Farm tour of Monsanto with Dr Alan Wier, plant breeding and research institute. Interviews with weed experts, biotechnologists, plant breeders, entomologists and viewing of experimental transgenic cotton varieties and traits such as Round up Ready Enhanced and Bollgard 3.

9. **University of Arkansas** – Visit and tour with distinguished Professor of Cotton and Crop Physiology.

**Findings**

“Knowledge is power” The community’s perceptions towards Genetically modified goods will continue to restrict open trade of Australian cottonseed production market. Overseas growers like our Australian varieties and enjoy our high quality seed and fibre. The main findings as to how this scenario maybe overcome is through understanding the reasons for the apprehensiveness towards it.

(i) The people of Europe does not trust the scientific community, and farmers have little creditability with communities as they are reliant on the governments for subsidies to survive in both Europe and the United States.

(ii) The basis of the European subsidy system is to provide equality of lifestyle for its members. Changes in farming practises by using gene technology may improvements in efficiency, however will have a direct impact on the livelihoods of people within lesser-developed countries within the European Union.

(iii) Gene technology within agriculture is saving people’s lives, however as much of the populous within developed countries do not see this as it does not directly effect their lives and are removed from agriculture.

(iv) Countries producing cotton within Europe and the United States tend to have fewer variables that will directly effect the production of cotton within their countries.

(v) When a successful labelling system is implemented within Europe for GM goods many more market opportunities will arise for Australia’s high quality fibre and for the seed.
(vi) Reforms of the subsidy systems are occurring within in the European Union and the United States. However they are here to stay and for Australian farmers to compete they must stay in the open market and with minimal assistance.

Publications and Presentations
It is expected that presentations of findings to rural communities and farming communities on the “how the subsidy system effects Spanish and Greek farmers” will occur at cotton association meetings, Country Women’s Association meetings, and cliental contact with my position. Articles for agriculture industry journals and newspapers are also intended.

Research
Research priorities as identified by this fellowship include;
1. Education programs for farming and urban community’s on current farming practises and biotechnology in agriculture.
2. The potential to capitalise on current insect management strategies in place within Australian cotton, greater sales of seed varieties and management techniques of Australian farmers.
3. Market opportunities for high quality cotton, and consistent volumes of production encompassing conventional and transgenic varieties.
4. Understanding of the European Unions and the United States subsidy system and using this knowledge to assist in gaining a comparative advantage within the market place.
**3. Programme**

**Belgium Brussels/ Gent  May 30th – June 5th**
- Dr Bernard Graciet Syngenta Head of EU Brussels office on the stance of Syngenta in Belgium and throughout the world
- University of Gent department of Science and Genetics

**Switzerland Basel  June 9th – June 13th**
- Headquarters of Syngenta International
- Interviews with Head Global Licensing in Biotechnology Dr Bruce Lee, Ken & Sue Flower, Ms Sheena Bethell, Dr. Patricia Ahl Goy.
- Laboratories and Greenhouse of Novartis and Syngenta in Stein. The centre of Genetic engineering & development & Chemical development in agriculture Dr. Andres Binder Dr Hubert Buholzer & Dr Peter Wysse (Entomologist)

**Spain Seville/Cordoba  June 15th – June 20th**
- Delta & Pineland International Dr Jesus Rossi Research and Trial farms
- Interview with farmers, industry representatives of Aventis, Bayer,
- Interview with Mr. Emilio Campos Representative and Forecaster to the European Union Government body for cotton subsidies.
- Interview with Monsanto representative for Spain Dr Carlos Vincente

**Greece Thessaloniki, Volvos, Larissa, Athens  July 2nd –July 15th**
- Thessaloniki Technology Park Centre of research into Biotechnology Mr. A Polidoras.
- Institute of Biotechnology and Inscription Institute in Thessaloniki, Director of Cotton Institute Dr Usania Kechagia, Mr Baster, Ms. Calmon Secela.
- Delta & Pineland Dr Anastasia Populopos coordinator of visitations with Bayer plant breeders and agronomists, field agronomists Mr Harilos Rohids of Ampelona and chemical resellers and Novartis supply company of Halk, Mr Dimitrios Stucourcos.
- Farm visit with the Tsiqlacoulis family a large cotton farm of 35ha’s and smaller family farms within villages surrounding Larisa.
- Hellenic Cotton Board and Hellas Cotton Research Institute Mr A Costas.
- Distribution and Agronomic teams and company owned by Dr Antonio Spiros
- Interviews with Large family owned Gin AKKAS Mr. Fokion Georgiadis in reference to how subsidies are gained directly to the ginner and then transferred through to the farmer.
England Jealott’s Hill/ London  July 16th – July 20th
- Novartis (Syngenta) Discovery Centre and laboratories for Biotechnology and Genetic Engineering Jealott’s Hill
- Luncheon Meeting with the Swire Group and the Swire’s themselves coordinated by Mr Tim Bridgeman London.

United States - Chicago, St Louis, Memphis, Stoneville and Greenville, Fayetteville  July 21st – August 9th
- Chicago Board of Trade
- Monsanto Headquarters and Research Institutes and farms Interviews with Mr Gary Barton, Dr. Andrew Reed, & Mr Mark Wells St. Louis in Illinois and Missouri, the Monsanto office of Memphis Mr Walt Mullins, Ms Terri Needham
- Breeding plants and research farms of Bayer Mr Jefferson Gywn, Monsanto Dr. Deborah Brickle, Delta & Pineland, Pioneer, Interviews with Farm Managers, Genetic crops agronomists and plant breeders and researchers, viewing of trials of future commercial varieties of transgenic cotton Greenville Mississippi.
- University of Arkansas Department of Crop, Soil and Environmental Science, Dr Derrick Oosterhuis Distinguished Professor in Cotton & Crop Physiology.
4. Introduction

Background
The Australian cotton industry on average produces 3 million bales of cotton per season and with an estimated average contribution to the Australian economy of $2.4 billion. This season 2002-2003 it is expected to half this amount due to water restrictions and the drought.

“Here are a few facts that may be of interest:
• Cotton crops use only 9% of Australia's total irrigation water
• Generally, cotton uses much less water than other crops to generate a given income
• More than 50% of Australia's cotton research and development expenditure is directed at reducing chemical use
• The most common pesticide found in rivers, atrazine, is not used in the cotton crop.” (Cotton Australia website 2002 environment section of “about cotton”)

Genetically Modified Cotton production in Australia
Monsanto has been permitted by the Australian government to sell a license to cotton growers to produce Genetically Modified (GM) or transgenic varieties of cotton. The National Regulatory Authority regulates these permits. Cotton currently has three lines of transgenic varieties.

1. Ingard cotton which is cotton which contains a protein called *Bacillus thuringiensis* (Bt) which is toxic to the pest caterpillars of Helicoverpa spp. (Heliothis), this main pest of cotton in Australia. It does have some effect on other caterpillar pest species as well. Bt only effects the caterpillar by causing enzymes within the insect’s gut to react to the chemical and eventually die. This chemical affects no other species of insects, and it is found naturally occurring within soils.

2. Round up Ready cotton. This cotton has the ability when young to block the herbicide *Glyphosate* or Round up (as a common name is used) from entering into the main stem and root system of the plant. This transgenic variety allows for fields to have blanket sprays of Glyphosate for a short period in time, which has little residual (more environmentally friendly), is cheap and safe to use when handled correctly.

3. Ingard plus Round up Ready cotton where the two modifications occur within the one plant.

Over the past 20 year Australia has relied on a broad spectrum of synthetic chemicals to control heliothis. The predominant chemicals used are Synthetic Pythreroids (SP’s) and Organo Phosphates (OP’s) which are in most household pest sprays. When SP’s and OP’s are used in a safe manner they are very inexpensive and are slow to Ultra Violet light breakdown unlike many of the more expensive and “target specific” chemicals. This allowed for protection from Heliothis for extended periods of time. However Heliothis have built up resistance or immunity to SP’s and OP’s. To combat this problem of resistance biological controls were introduced such as use of Bt a toxin found in soil
born bacteria that effected the caterpillars digestive system. This protein was isolated and the DNA sequence added to the cotton plant as the 1st natural plant protein toxin. Bt toxin is an important strategy today for the control of heliothis.

The production of Bt cotton is capped as to slow the forming of resistance to the single gene within the plant. Refuge areas are required to allow for a population of Heliothis to go through a lifecycle without exposure to Bt thus diluting the total population of Bt and slowing resistance. Commercial release of Bt cotton with two genes will occur in 2003-2004 season where it is expected that the two forms of Bt within the plants will have less resistance capacity to the single gene. Simply if one doesn't get them the other one will.

Other problems associated with cotton is that Australia only produces 12% of the worlds export cotton, this means that it like most primary goods in Australia does not have much influence over the global markets and pricing. The main exporter are the United States which produces 6 million bales on average, Uzbekistan (3.5 million bales). “Around 200,000 bales of the cotton grown in Australia is spun by local spinning mills, the remaining 94% is exported, largely to Asia. Indonesia, Japan and Thailand are the main buyers of Australian cotton with other countries including South Korea, India, Taiwan, Italy, Bangladesh, the Philippines, Hong Kong, Turkey and Ireland.” (Cotton Australia website 2002 exporting and marketing section). Although most of these markets are geographically close to Australia, the increase in threats of stock market volatility, decline in domestic gross margins, “dumping” in the market place, means Australia must work harder against larger competitors with no direct assistance from the government in forms of subsidies or tariffs.

Genetically Modified Cotton production in the EU and the U.S.

At this point in time there is no field production or field trials of transgenic cotton varieties within the EU. The U.S. on the other hand has over 80% of total production under transgenic varieties for insects and even higher for Round up Ready.

This Churchill Fellowship has allowed me the opportunity to:

- View other community’s cultures and beliefs and understanding of what GM technology is by farmers and the community.
- Education, current information and understanding of GM crops.
- Production and how subsidies are redistributed to the farming community.

The purpose of the Churchill Fellowship in America was;
- To find out if America does have regulations in place in conjunction with its licensed use of transgenic cotton. If so what are the limitations and do they require refuge areas like in Australia?
- Understanding the need for a subsidy system in a nation where technology and efficiency in productions is rapidly adopted.
- How big a multi national corporation Monsanto really is
- The future possibilities of the technology and how it may effect Australia.
5. Factors involved with the lack of adoption of GM crops within the EU.

5.1 Community beliefs and cultural differences

European agriculture is a very conservative community. The advances in production through biotechnology were not accepted very well and there was a fear of use by the agricultural community.

The American company “Monsanto” is the major stake holder in much of the biotechnology implemented in crops such as cotton. Monsanto’s release and promotion of this product caused a lot of negativity by the agricultural community and by the E.U.

The way the company projected the product seemed as if they were telling the conservative community it was necessary for them to accept it, it is the way of the future it is good for them it will make them more efficient and effective farmers. This line of thought was not well accepted probably due to a fear of corporate control of crop and seed management by a large multi-national company and the uncertainty in changing the crops genetic structure.

Reactions of the European people

Throughout Brussels, Switzerland, Spain and Greece the producers reactions were, “if a small company had discovered and used the Biotechnology first, then it would not have been and issue for the people around Europe to accept the technology.” Since a multinational corporation promoted it and had control of some of the world’s largest seed companies, it was seen as the corporation had the power to take control of the worlds farmers, thus food production, thus control of the people of the world. Monsanto’s projection of the idea of the new technology was the same style as projected to the American people whose culture and “gunhoe” approach has made them world leaders, but this is not the culture of conservative Europe.

5.2 Political Party strong holds

The Green parties in the E.U. have far more power than in Australia and the U.S. There is a conscious effort for conservation. Somehow this concern became equated with having to stop the use of genetically modified products or their production.

The community of Europe no longer trust the scientific community when it comes to agriculture unlike other countries. The B.S.E. or Mad Cow disease scare and other concerns with food production make the European community very wary of accepting a new form of product. Hence Europe does not trust science.

People of wealth and power within the community have joined these groups giving them more strong holds over governments than within other “western” countries.

5.3 Education, current knowledge and understanding of GM crops by the farmer and the community.

“Biotech is the symptom of community fear not the cause” (Bethell S 2002). Since the concept of Biotechnology itself is complex and highly sophisticated many people do not understand the “science” involved and the main concern is that there are no boundaries or limitations found as yet as to what this technology could change in the world, as we know it today. What is forgotten however is that Genetic Modification have been occurring through nature selection for millions of years, and that man has been assisting in this process for thousands. The inception of genetically engineering plants to produce qualities otherwise impossible without scientific intervention is the
process of Biotechnology that my project is focused, however will be referred to as genetic modification.

The European Union is a combination of developed and lesser economically developed nations. Traditionally these lesser-developed nations have a greater proportion of their income coming from the agricultural markets and the more developed nations from Information Technology and manufacturing. The larger and wealthier the nation, the more power they have over policy decisions in all industries and trade to and from the European Community. These more developed nations such as Germany, France and Switzerland also have lower proportion of farmers making up their populations, with some of the higher levels of education as well.

The idea of the use of biotechnology to reduce overall chemical use is beneficial to people and the environment.

1. For the People
   - Biotechnology in developing countries can allow for farmers to become more than subsistence by increases in production. It has allowed farmers to be able to send their children to school.
   - Decrease in mortality rate of population due to less exposure to chemicals. (Knapsacks over the shoulder)
   - Many developed nations do not understand how biotechnology can help them, as their food currently does not have any insects or disease. They don’t understand that this is due to chemical use in the production of their foods.
   - Changes in products may serve to increase shelf life and thus making the product more manageable for people were refrigeration and storage are a major problem in the waste of products.
   - The increase in production would hopefully allow people of developing nations to have more product available and thus decrease the price of products.
   - The advancements in vaccinations and vitamin supplements into foods via Genetic engineering. (Golden rice which contains Vitamin A and is assisting in lowering the level of blindness in Asian countries)

2. The Environmental issue

   Genetically engineered crops are providing most benefit to developing countries especially Asia where GM crops are allowing for less land clearing and degradation of forests and world heritage habitats of endangered species of animals. 

   Biotechnology provides efficient land use of developing countries. When less land is needed for clearing for land use as the established land is then sustainable for long term production. GM crops encourage overall less use of pesticides in environment of the world.

5.4 The system of lifestyle equality within the EU (subsidy system) and how potentially GM cotton could effect communities in countries where it is grown.

   The idea of the union was to make all nations within the union have a similar quality of life and similar lifestyle; hence the poorer countries or members of the EU
population were given the most funding. This of course will assist the more wealthy countries in the end anyway as when poor people receive more income (through subsidies and assistance) they spend more money on cars, housing and equipment, machinery, clothing etc which in Europe is predominantly made and distributed in the more wealthy countries. The effects of this is;

- Now people mainly farmers are accustomed to the new lifestyle they have which they achieved in only one generation where the previous hundreds could not.
- The number of votes for the EU is dependent on population size hence countries like France have more votes (more decision making power) in the EU.

A perfect example of this above situation is the want for Bt cotton in Spain. Spain is heading into a similar scenario to Aust in reference to resistance to SP and OP’s. They in a few years time will be in the same boat as Aust however without any biotech used. They have the helicoverpa armigera spp the world’s nightmare. It was put to the EU that Spain be granted this use of the technology. Initially, France, which has more votes, was not concerned with Spain producing Bt cotton, as no cotton is grown in France. However there are many links between countries for particular reasons both cultural and historical as well as market trading. Greece does influence France due to horticultural market ties, and the cotton produced in Greece is not subject to heavy or resistant insect pressures and therefore is not in favour nor need for the technology. Hence it externally applied pressure to the French and Spain lost the vote to use Bt cotton.

5.5 The agronomics of production of cotton within the EU and how GM crops would be of benefit or downfall to individual countries.

SPAIN
The main cotton growing area of Spain is within the South and surrounding areas of Seville and Cordoba. Spain plants 80 to 100000ha’s of cotton per year depending on water availability.
A limitation to biodiversity and rotational cropping within this area is the high salt content of the soils. Cotton is quite tolerant of salt hence better suited for this area. Cotton is the main crop of social status and of any real profit in Spain. A Spanish farmer able to grow cotton is considered to be well skilled, a good manager and own land of better fertility than other area.

Other variables and limitations to cotton production within Spain;

1 Very highly resistant insects (mainly helicoverpa armigera spp) to SP’s and OP’s this is the same species and situation Australia has however Australian management techniques are a decade ahead of those observed in Spain.

2 Verticillium disease with Olive trees as well as the cotton with a mutant species of the pathogen that kills plants outright. To combat this disease problem the main varieties of cotton grown are Australian Sicala V2 and Delta Opal due to their less susceptibility to Verticillium.

3 Average farm size in Spain is 10 hectares.
4 All cotton is irrigated in Spain, as there is basically no summer rainfall. The main irrigation system used is moveable pipes on furrow irrigation without plant beds.

5 The Southern countries of the EU do not have a great deal of wealth. Public breeding program are not a high priority (no equivalent to CSIRO) so private companies provide most of the development information.

Discussion and observation

Since crops are subsidised the quality is not a high priority as lint contamination from weeds as not an issue. Cotton is a social crop; rural communities are dependent on farmers using workers on farm. Chipping, irrigating and farm work very important thus the use of herbicide resistant crops are not necessary, and can have a financial impact on rural communities and urban communities can’t support more people, as well the number of potential unemployed if farming were to become efficient. The use of current technology of Round up Ready cotton would not be possible within Spain as the use of plastic covering the rows to induce heat units also covering the plants until after the time frame that a blanket spray of Glyphosate can be used.

The use of Bt cotton on the other hand will become a main priority for Spain as they too will find themselves in a similar situation with resistant insects’ as Australia. However without Australia’s resistance management strategy and independent research and development divisions for assistance, the Heliothis populations will destroy the Spanish cotton industry in a few years.

Greece

The predominant growing areas of cotton in Greece surround the cities of Thessaloniki, Volvos and Larisa. Almost all the cotton produced is by methods of mechanisation however very small areas in the East hand pick. Planting within the North of Greece occurs from 15th of April to beginning of May. Planting within the South where temperatures are warmer occurs from the 1st of April. Cotton area is calculated in Stremma’s where 1stremma is equal to 1000sqm hence 10stremmas is equal to 1 hectare, with an average of 400 kilograms of seed cotton per stremma. Average yields are the equivalent to 4bales/ac which is on par with Australian average production per acre of land. (1 hectare is 2.471 acres)

The main export from Greek cotton is the oil from the seed. The oil is used mainly in cakes, confectionary and other foods and is preferred within these foods over another main oil export Olive oil as it has very little odour and is less expensive to purchase.

The main variable affecting cotton production in Greece is water availability. Water quality and tables are low and research into such varieties of crops with tolerance to drought conditions is well sort on. As well as disease tolerant varieties as rotation is not a common management practise.

Greece has very low pest pressure in general and the main pest species is the pink bollworm and chemical control is recommended on a seasonal time frame and pheremone trap basis. The seasonal climatic conditions do not make an ideal habitat for resistance to build within insect species, as the generation numbers for a year are low. Therefore the use of Bt cotton within Greece for caterpillar pests is not necessary or wanted. The use of Round up Ready within Greece will have negative effects on the rural communities by decreasing labour intensive farming practises and therefore employment. There are very few jobs available within other industries and unlike
Australia, the farming community has a strong influence over the government and the people of Greece. Over 20% of the population in Greece are farmers, in Australia less than 4%.

An example of power was expressed by the farmer trade union last year when farmers did not receive subsidised pricing for some of their seed. The union took action and placed 300 tractors on the main highway that connects the North of Greece to the South. No goods could get through and government action to assist the farmers was immediate.

5.6 Production of cotton within the EU and how subsidies are distributed to cotton growing countries.

Subsidy distribution is set from a budget set up from the forecasting. The budget for cotton must be kept. The price at the beginning of the season is unknown to the farmers as to the price they will receive for the seed cotton per tonne. The EU can’t secure a price at the beginning as to changes within the world market price and therefore price has a large impact on the size of the budget set from one year to the next. If the world price is continuing to decrease then the size of the budget of the subsidy must increase so a target price for goods is reached for farmers to sustain lifestyles.

Ginners are very important in distributing the subsidies from EU to the farmer. Subsidies are based on target price of goods and the world price of cotton. Seed production is over 60% of the marketable product and 40% lint. Thus quality is not as much an issue as moisture content and other factors affecting the seed oil quality and content. The production of seed is a target tonnage decided upon by the EU. If production is over the production limit then penalty rates as percentages and against both the target price given to Ginners and (minimum price) minus (penalty).

Spain like Greece needs the subsidy system for farmers to survive. Due to farm size, the costs of production, low world prices; limited infrastructure in other industries and efficiency increased the problem of unemployment would be even higher than current 10% figure. Whole communities rely on farming for incomes thus huge social issues. The reason the two countries hold cotton in such high regard and over produce in terms of budget sizes is the fact that the subsidy on cotton seed is by per kg bases. This is different to other crops, where the whole industry not on a field size or total volume produced is subsidised, thus there is more money to be made in producing cotton. Therefore over production is occurring, as a consequence the penalties imposed by the EU taken from the base price make the subsidy becomes so small that little money is given to the farmers for the production and delivery of their crops as was the case last year. Ginners receive the target price that is higher than base price given to the farmers. Ginners are also subjected to the penalty system within the EU budget.

Since farmers are paid by volume or weight of lint and seed. Many “tricks” are used to increase the payments they receive for instance rock and dirt distributed through the cotton load and or wetting the cotton. This can be a dangerous and expensive situation for ginners as this may cause fires within their plants due to combustion and rock destroying machinery. Ginners indicate that there is a form of premium paid to the ginners for the good quality lint as well as the subsidy on the seed, therefore it seems ginners would be interested in the adoption of biotechnology by farmers to decrease processing costs, yet this is not the case. So the subsidies given must out-way the potential benefits of biotech use in cotton.
5.7 The traceability system, and regulation requirements for entrance and trade of crops possibly containing GM seed into the EU.

Legally transgenic crops have patents against them already and for each country a patency must be submitted before use.

Government’s organizations have been simply delaying making decisions on the patience submissions and the regulations for use.
(a) safety aspect
(b) trials and stability of products

On a Commercial level
In July the EU did make a decision as the courts were requiring it. This brings more problems of community unrest and loss of popularity for governments for not making a clear decision for or against the production of GM’s within the EU. Some country’s governments have made decisions for or against the use of GM’s however it’s the Union of 15 countries that will not make the decision. By continuously questioning the technology, there is no need for decisions being made by legislators either (example question like (a) and (b))

Regulation permission works on a basis of political basis not from a commercial one. Importing products to any EU country needs approval from EU government. At this not possible to bring in transgenic crops in EU the stalling of approval for feed animals and food products.

To allow for transgenics the traceability system is wanted to put into place before allowing GM crops into EU. This may be very hard to do so there is a “level of threshold needed” which means there must be a level of “danger” in some form therefore this is not wanted. The expense to establish this system is the other reason for not making a decision.

For a traceability system to work, it will have to be labelled to the consumer this is very hard to do as there is no science available to test a good such as cotton seed oil as the protein is not carried through in the oil. So there is no accurate no means of testing where it would be “GM free” or not. Another example would be if eggs needed to be labelled as the meal feed to the chickens contained seed from GM crops. It here is impossible to test.

To set up the traceability system for labelling there must be:
  Liability
  Monitoring and recognition of thresholds and basis to measure
  Labelling
  And who and how to ask questions, the (a)media
(b) science (c) industry (d) community as they want good food with what level knowledge of its production process.

The political dynamics of the EU community is now torn between the ‘civil society’ groups who now see themselves as the protectors of the rights of the people and all creatures, since the government and science have been seen to “fail the
people” after the BSE crisis. The problem for the people lies in the fact that which group will be the most beneficial to the whole community and how much power do they have and what will they do with this power?

The issue of safeness of the biotechnology is the main concern and it is separated into 2 sectors. Environmental and Human. If there seems not to be a change in the goods directly for consumers and people do not see a change in the food on their plates then they see no need to bring in the technology and they do not want it.

5.8 Why this technology will continue to be rejected in the near future within the European Union.

The exploitation of the term “GM free” by manufacturing companies is already occurring. Foods where there are no biotechnology available (eg almonds) are being packaged and promoted as free. This means to the consumer who is prefers to have no contact with GM technology is being treated like fools by food processing companies and by the media. This implies intelligent individuals are merely sheep, this is a consequence of lack of exposure, therefore a real need for communities to be educated about how the food they eat and how it produced is very important for the advancement and sustainment of agriculture in the future. Busy lifestyles in many instances do not allow for this additional education hence government bodies are expected to fill this void and “protect the people” unfortunately the vicious cycle is complete as in many cases the people who have little time to learn about the technology involved in agriculture are also the people who fear it and call for the government to reject it.

If the GM crops are used in Europe then potentially farmers will become more efficient and less proportions of subsidies are needed thus to sustain the lifestyles farmers currently have they will need to use more land. This will cost the governments and EU more money, as production from agriculture is more expensive then no agriculture in Europe. The EU must keep farmers on their very small areas for the cost of unemployment would be too high if all small farmers stopped farming. With greater efficiency of larger farmers more land use is needed and at the environments expense, the green party’s within many of the countries are too powerful for this to occur and governments will loose the trust of the people and EU communities totally.

5.9 The adoption of GM production and open trade consumption potential within the EU.

At this stage the provision of the traceability system and or the over production of information to the communities will only achieve the acceptance of GM crops into the EU. Education in the form of information on GM safety, production and locations of production. Only when “too much” information has been provided to the people, their fears turn to the care free attitudes with which they have towards the foods they currently consume.

Australia’s comparative advantage here for the future will be that our cotton is already of the highest quality in the world and demand for our goods will increase as our methods of production are flexible and encourage stability for supply.
6. Factors involved with the extensive production of Genetically Modified crops within the United States

6.1 “In God we trust” and “in Science we have faith.”

The American populous have not experienced many disappointments in science have not the similar apprehensions that the European community does. Progression and adaptation of Genetically engineered crops seen as opportunistic and an improvement on farming practices. The Bt cotton was first released in America and had their Helicoverpa spp in mind it has been extremely success and the adoption of the technology rapid over a 10 year period. Today over 80% of America’s cotton is transgenic (Bt and Round up Ready). Yields have increased, the total tonnage of pesticides used within the environment had decreased and so far there has been no detrimental side effects or mutations to the environment or the community. America is already in commercial use of the next generation of Bt cotton with the introduction of a second Bt protein which has greater toxicity to the pest caterpillar and plants with a capacity to spray Glyphosate over the top of them for longer than current Round up Ready varieties. Incorporating the transgenic varieties with Integrated Pest Management methods is decreasing costs, and imposed less pressure on the environment.

6.1 & 6.2 The benefits to the world of cheap food and clothing

As the environment is a finite resource the capacity to expand food and fibre production is limited. Productivity must continue to increase with the world’s population and at a value that most individuals can obtain. Production costs of cotton are increasing rapidly and environmental conditions are slowly becoming less favourable for non precise farming methods.

6.4 Understanding the need for a subsidy system in a nation where technology and efficiency in productions is rapidly adopted.

The U.S. farm bill is set up to support the farming sector of the U.S. The population of farmers in the community is similar to that of Australia less than 4% hence they have little influence over government however they do provide significant contributions to the economy. The U.S. has a population that requires more food and fibre than the domestic markets can provide. Hence to sustain the domestic market within the future and advance itself within world markets, the U.S government protects its agricultural industry with a system of subsidy

The farm bill is made up of 3 income supports.
1. Marketing loans- these apply to actual production of covered crop.
   - If price falls below the loan rate- the government pays the difference.
   - Farmers can only collect after the crop is harvested and before the crop is sold.
   - It has no effect if cash prices are above the loan rate.

2. Fixed decoupled Payments –
   - Are unrelated to actual production
   - Are paid on historic base and yield of farm
   - Can have payments split over a season.
3. Counter-Cyclical Payments
   - A target price is set similar to that of the EU.
   - To achieve payment rate deduct effective price and decoupled payment rate.

An example of a Cotton producer’s revenue from current production.

100 acres @ 640 pounds per acre = 64,000 pounds
Cash price = $0.32/pound U.S
64000 * 0.32 = $20,480
Loan payment rate (target price) = loan rate – Adjusted world price
LP rate = 0.52-0.28= $0.24/Pound
Loan payment = 64,000 * 0.24 = $15,360
Therefore a total revenue for cotton crop = $20,480 + $15,360
= $35,840

Australia varies to differently as farmers receive only the adjusted world price.

6.5 Monsanto the smallest of the giants.

Globally Monsanto has an estimated turnover of $5.8 billion dollars. This is relatively small compared to the turnover of European based chemical companies such as Syngenta and Bayer which are more than double this amount. The perception of a huge multi giant corporation is then rather false and the perception may stem from the fact that they are American and they were smart enough to patent most of the technology first.

Monsanto is committed to providing continuous education so that choice for consumers can be based on information not emotions. Monsanto is very dedicated to the community’s of the world and they are customer and environmentally focussed. The Pledge to its customer is based on 5 commitments. Dialogue (listening to diverse points of view) Transparency to ensure that information is available, accessible and understandable. Respect for religious cultural and ethical concerns of the people throughout the world. Sharing of knowledge and technology to advance scientific understanding and to help farmers in developing nations. Benefits to ensure delivery of high quality products that are beneficial to customers and the environment. This is a very positive step in achieving adoption, and understanding as well as ultimately profits.

6.6 The future possibilities of the technology and how it may effect Australia.

The possibilities of this technology into the future at this stage are boundless. Advancements into improving the general health of the world’s populations, improvements to the sustainment of the environment and greater productivity from existing farming areas is the focus for this technology. The possibilities are becoming realities for such conditions as reductions in soil erosion, salinity. The adoption of Roundup Ready has enabled many farmers throughout the U.S. and Australia to use minimum tillage farming practices. As a result a reduction in use of machinery and fuel requirements is becoming apparent. The overall reduction of pesticide use is a reality and medical advancements is community health is a goal that will be achieved.

The speed at which the U.S. community is accepting and adopting biotechnology will not have a direct effect on the Australian industry. The combination of the protection of the markets and the U.S farm bill as well as this adoption process will. The U.S will be able to provide cheap and good quality fibre for the world. Australia’s
advantage here then is to ensure that patency is placed on our seed and that the industry
standards for quality are lifted so that on the international market our product stands
above the rest.

Australia must keep close ties with Asia to hold their market share in the fibre industry
to survive in the long-term, this will not be a simple task however with the assistance of
biotechnology it is achievable.
7. Conclusions and Recommendations

Our country should pride itself on possessing one of the most highly technically efficient cotton industries in the world. Australia’s ability to produce a self-regulated industry that produces the highest quality cotton in the world should be congratulated. The more favourable varieties now grown within Spain, Greece and parts of the United States are Australian and chosen for their traits of climatic and water stress tolerance, disease tolerance and yield potential.

Europe and the United States do not experience the debilitating constraints to production such as extreme insect pest pressure, arid climatic conditions, and geographically isolation operating on an open market. Yet in the face of all these constraints Australia produces some of the best yields, the highest in quality of lint and seed cotton, and adapts to new management technics and environmental restraints at a speed tenfold to their fellow growers in Europe. The foresight of Australian growers to preserve their environment is of a world-leading standard. Agronomic management practises are similar to that of the United States, however our average yields per acre are higher and Australian growers are not directly subsidies for the price of their goods.

A community’s perception of biotechnology is based on education of the current facts. For so many countries the majority of the community is so remote, and in a sense ignorant of the agriculture industry, yet we all eat and we all wear clothes. Community’s within developed countries directly gain from, and see the benefits from biotechnology within medicine and pharmaceutical’s, they do not gain directly as farmers do from biotechnology within agriculture, hence the many do not see or understand a need for changes to plant and primary production. The farming community’s of less developed countries outside the European Union will benefit more from the use of biotechnology in agriculture than others as it is saving people lives and the environment.

European farming from the Unions perceptive in many countries is unnecessary for the economy’s survival. Farmers do need the subsidy system to survive. Socially the European Union as placed farmers in an inefficient means of production of primary goods, by encouraging equality of lifestyle between countries within the Union this in many countries has not encouraged improvements in management of crops due to variations in water availability or changes in environment conditions. As a result many farmers especially within the South of Europe are not motivated to adopt transgenic crops.

It is not in the interests of the EU to have farming technically efficient or competing on an open market like Australia, as rural populations will decrease and greater pressure on the environment imposed to successfully compete on the international market. This is not possible at this point in time for four main reasons;

(a) There is no more available land. The cost to the Union both financially and to the environment is too high for farmers to become more efficient or subsidies to be reduced to a scale where farmers compete on the open market like Australian farmers.
(b) The European Union cannot finance higher levels of unemployment nor have the funding for large-scale job skills programs for farmers that would leave the land.

(c) There are no other jobs. Southern countries within the European Union already experience high levels of unemployment and overcrowding of cities, rural communities are necessary and jobs within them. There is very little infrastructure within Southern European countries and agriculture is a main source of their economies.

(d) The Union decides what countries within the union can produce and the volume requires of goods for the economy within a financial year. Genetic technology will not be adopted within cotton growing areas until the Union government allows it, even if a country like Spain will require Bt cotton for the industry to survive.

In science we trust, and we Australia must. It will be through science that Australia will gain strong holds in niche markets, and greater demand for the high quality fibre produced. In the long-term Australia’s ability to influence international markets is minimal due to the comparatively small volume of cotton produced and its geography to consumers. For a viable cotton industry to survive within the future, education of the whole community is needed.

- Education of growers about successful implementation of new technology and adaptation of management techniques to deal with changes in variability’s such as water availability.
- Education to urban population of agriculture and the benefits domestic consumers will gain from understanding exactly how and why their food and fibre is produced.
- Education of supply companies of gene and chemical technology to provide comprehensive information for the whole community.
- Education for consumers and producers to listen to all the current information available. Learn how to seek the truth and not base opinions of highly advanced technology on media sensationalism and misinformation.

To address the issue of a sustainable cotton market for Australia, it is suggested that one must “know its nemesis” the other cotton growers of the world. To understand the cotton subsidy system of the European Union and the United States is the key to finding the weaknesses in the system and understanding where is potential to capitalise on this is from season to season. Markets for cotton within Europe will become more accessible for Australian cotton in the future. This will be achieved when a successful labelling system for goods is implemented and when more subsidy reforms occur within the Union.

It is to Australia’s advantage that it has stringent legislation towards gene technology. It is important for farmers not to become complacent with farming practices especially when using gene technology as some have within America, this will lead to resistance in pests and diseases to the technology and problems associated with sales in the market place.

Fear stems from ignorance and lack of information, fear of the “unknown factor” of any technology should not be considered and excuse by society when the basics are not learned. And there are always choices and markets for consumers wishing not purchase Genetically Modified goods.
8. Bibliography


