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INTELLECTUAL PROPERTY MANAGEMENT IN THE DEVELOPMENT OF A
MEDIUM-SIZED ARGENTINIAN SEED COMPANY

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1. Introduction

This paper will introduce the relations between the licenses and services which RELMO has established with seed companies and research institutes, from the point of view of intellectual property management within the current framework of widely publicized transgenic events.

In order to achieve an understanding of the environment in which RELMO operates, we will describe in brief agriculture in Argentina during the past ten years.

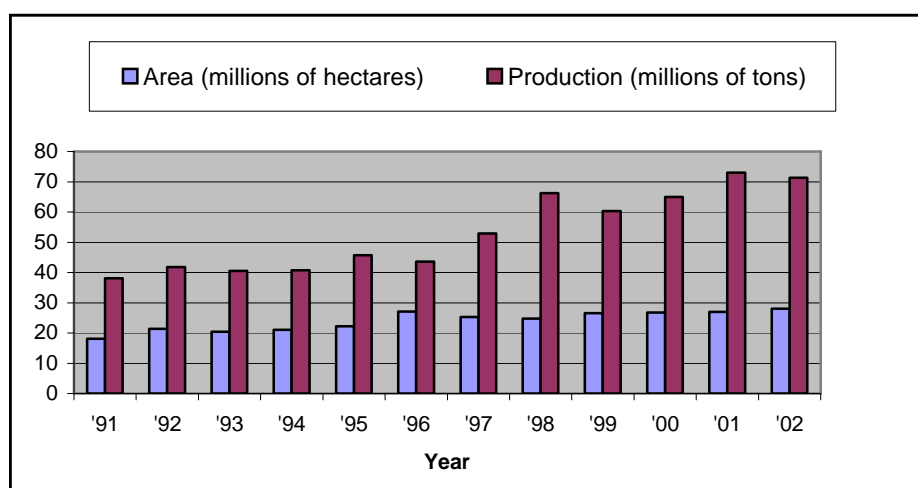
Finally, we will discuss the importance for a medium-sized company of respect for intellectual property, and will highlight advantages and shortcomings in the new context to which the commercial liberation of transgenic events has given rise.

1.1 Agriculture in Argentina

1.1.1 Cash crops and production

Argentina has approximately 28 million hectares under cultivation. In the past decade, grain production (soybean, wheat, maize, sunflowers and other minor crops) has doubled, increasing from 35 to 70 million tons with an increase in the area under seed alone from 19 to 28 million hectares. With an increase of 47 per cent in the area covered, production has doubled. Two factors are relevant, the significant increase in the area and the increase in overall production, with the reasons being due, as always, to various factors: currency stability and futures market, which have allowed producers to cover themselves against variations in prices, elimination of export taxes and supply of available technology – direct seeding, biotechnology and adapted high-yield varieties which producers rapidly adopted with the consequences that can be seen in Graph 1. The use of technology was spectacular, for example in only six years, the conventional varieties of soybean were replaced by RR (round up ready).

Graph 1 – Production and area per year

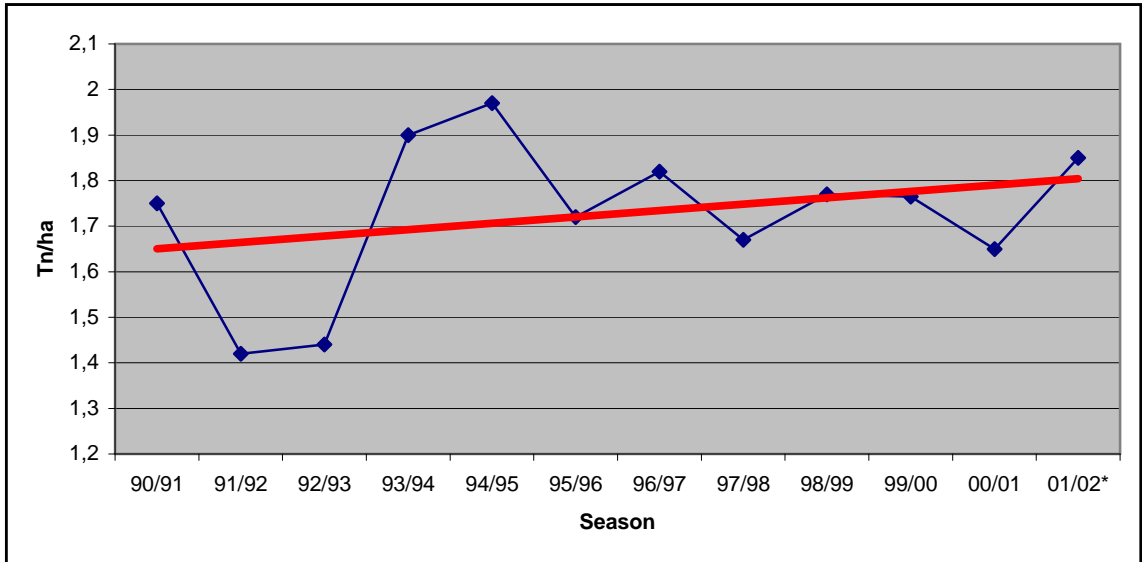


Source: SAGPYA

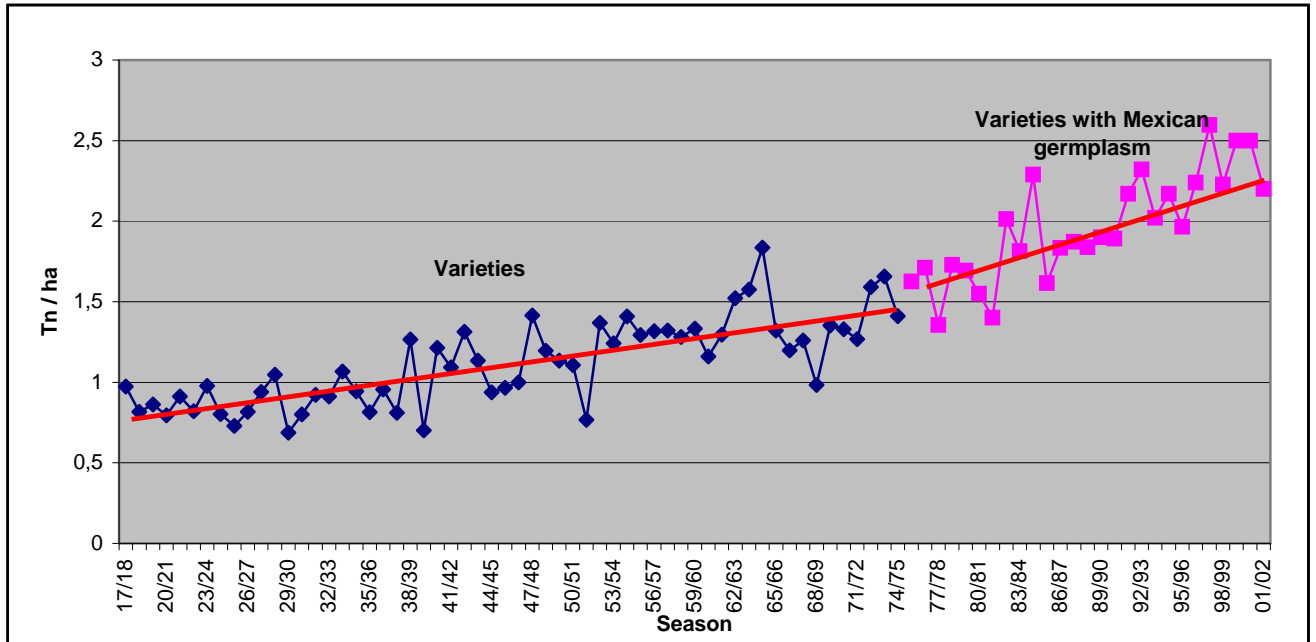
The unit yields of the main crops are shown in Graph 2. The steep increases in the yields are eloquent testimony to the work done and to the value of the seed industry.

Graph 2 –Yields of main crops in Tn./ha. Source: SAGPYA

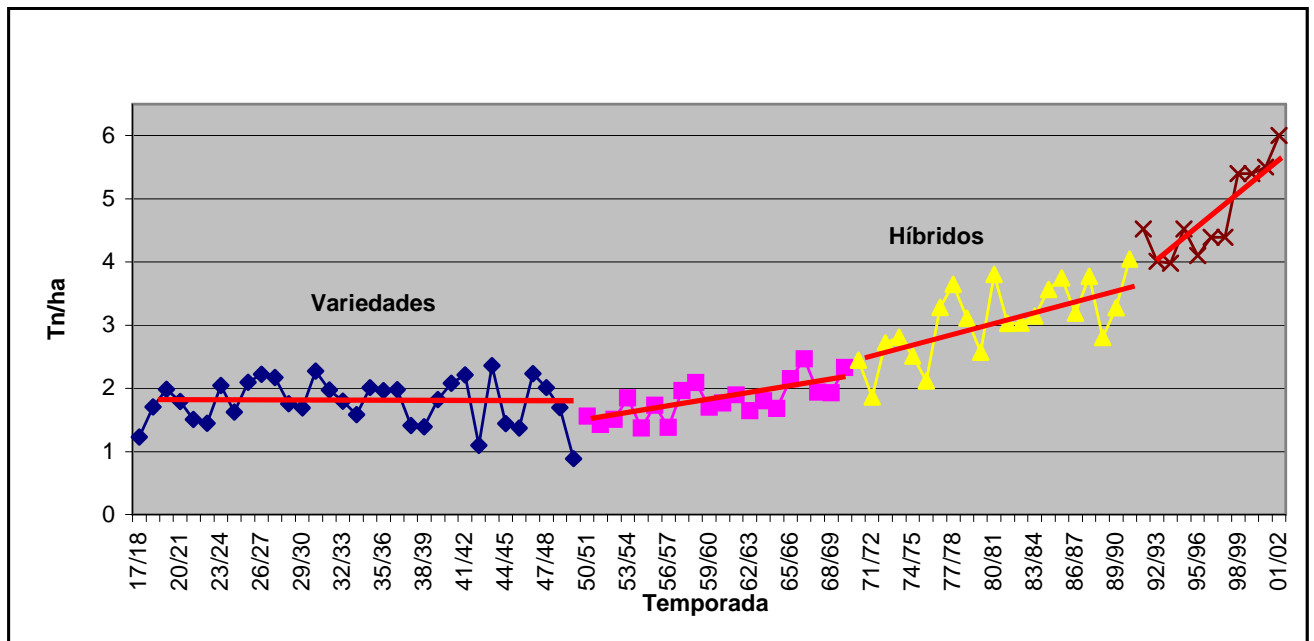
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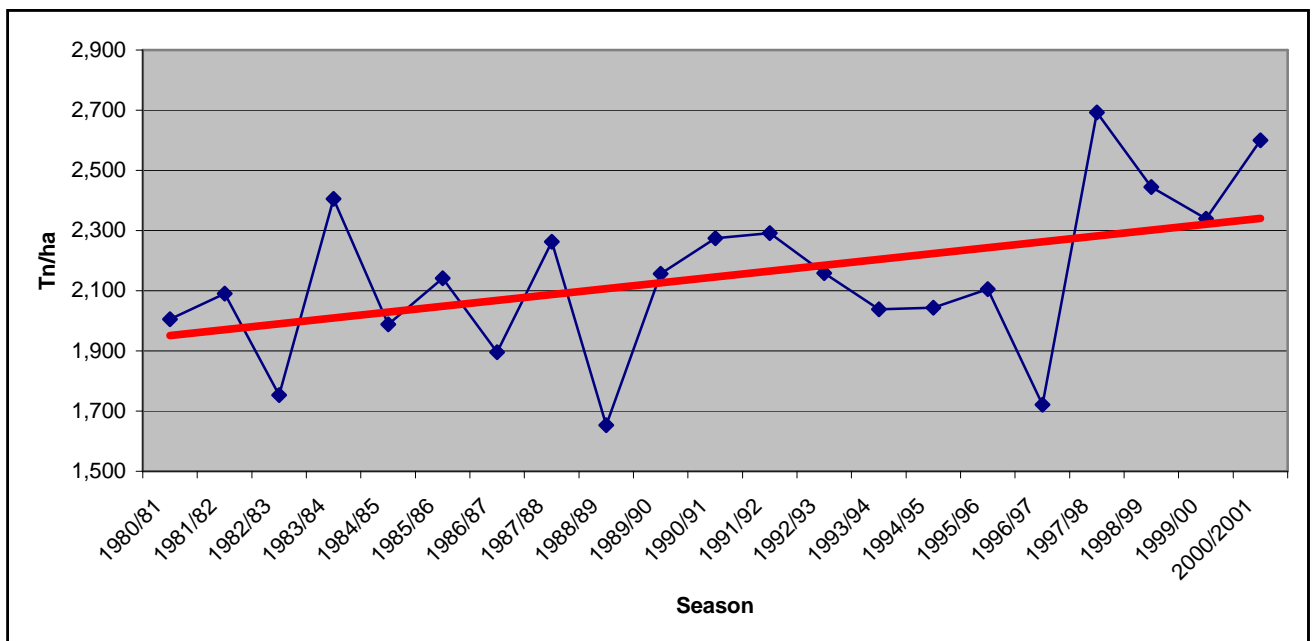
WHEAT



MAIZE



SOYBEAN



1.1.2 Commercially approved transgenic events

There are seven commercially approved transgenic events (Table 1), in three crops, soybean, maize and cotton. The commercially important ones with a strong impact to date have been the event MON 810 in maize, with resistance to lepidoptera and 40-3-2 in soybean, which provides tolerance to glyphosate. Events MON 531 and MON 1445 probably also have a strong impact on the crop, since they provide resistance to insects and to glyphosate for cotton, although the area has been greatly reduced in the past few years, as has been the case

in other producer countries, to a certain extent owing to the lack of competitiveness over soybean.

The approval of transgenic events in Argentina takes place in three stages: the first is the study by the National Agricultural Biosafety Commission (CONABIA), which considers each event and provides authorization or otherwise for field tests; the second is food safety and the third is export market analysis, taking into account the country's interests. For example, the event GA21 is judged favorably in the first two areas but not in the last, which is that of market analysis, for which reason it has not been granted free market access.

Table 1 – Commercially-approved transgenic events

Species	Event	Characteristic
Maize	E-176	Resistant to insects
Maize	MON 810	Resistant to insects
Maize	T 25	Tolerant of ammonium glufosinate herbicide
Maize	Bt11	Resistant to insects
Soybean	40-3- 2	Tolerant of glyphosate herbicide
Cotton	Mon 531	Resistant to insects
Cotton	MON 1445	Tolerant of glyphosate herbicide

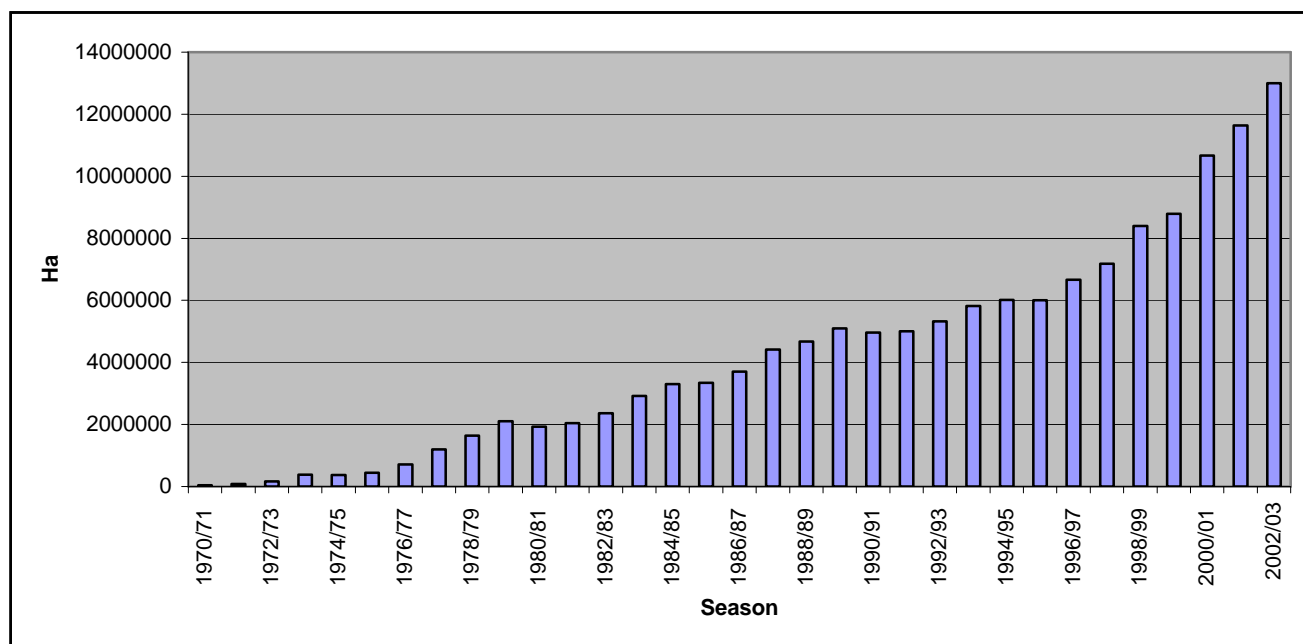
Source: ASA

1.1.3 Soybean cultivated area

In 1973, 170,000 hectares were cultivated and in 2003, 13,000,000 (Graph 3). Argentina is now the major world exporter of oil. With the new technologies – direct seeding and varieties resistant to glyphosate – soybean has become a colonizing crop, with which new areas of cleared ground or pastures are beginning to be cultivated.

Of the total amount under soybean cultivation, 99.5 per cent corresponds to transgenic soybean which has been strongly adopted by producers. And, on the part of seed producers, a rapid and varied supply of varieties has meant that the replacement process has taken place in not more than three years.

Graph 3 – Area cultivated with soybean

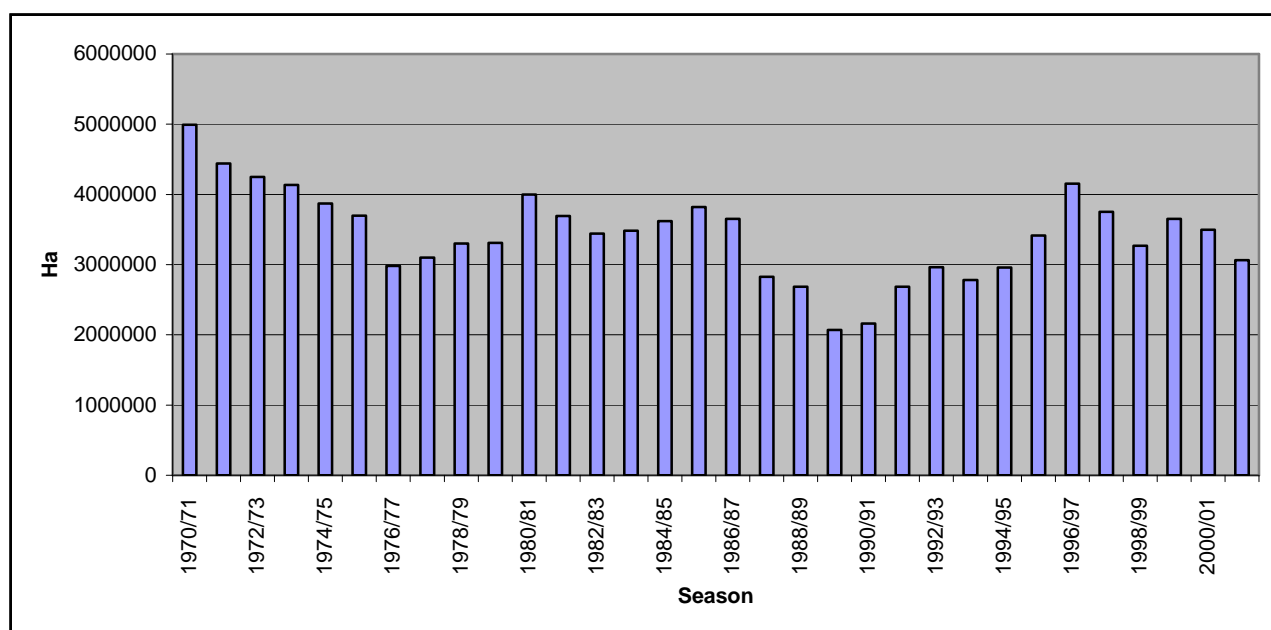


Source: SAGPYA

1.1.4 Corn cultivated area

As may be seen in Graph 4, the area cultivated with corn –maize- has remained relatively stable, despite the fact that soybean is a crop which is simple to handle and which generates better margins for producers.

Graph 4 – Area cultivated with maize

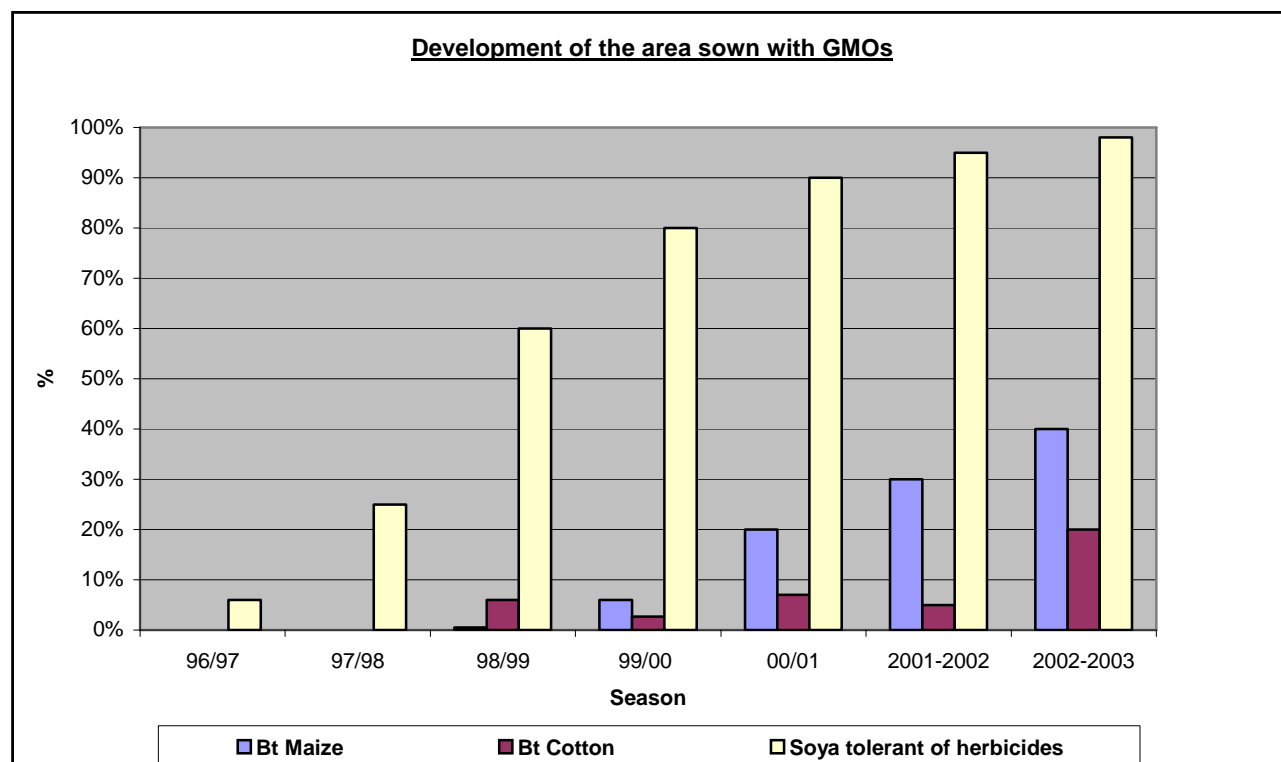


Source: SAGPYA

1.1.5 Impact of transgenes on Argentinian agriculture

The adoption by producers of new technologies has already been mentioned. Graph 5 shows the percentage increase in the share of transgenic crops, and soybean increased from six per cent of the total area under cultivation (37,000 hectares) in 1996 to 99.5 per cent (12,935,000 hectares) in 2002/2003.

Graph 5 – Share of transgenic crops



Source: ASA

Maize increased by only 0.25 per cent (8,000 hectares) to 40 per cent of the total area under cultivation (1.12 million hectares). Cotton increased from 2.7 per cent in 1999 to 20 per cent in 2001/2002.

The registration of new varieties of soybean is now covered almost entirely by RR (round up ready) varieties, as may be seen in Table 2, and that for maize hybrids also shows a strong increase in transgenic varieties (Table 3). This is a clear indication of where genetic improvement is heading in Argentina, based on producers' expectations.

Table 2 – Registered soybean (1995 - 2003)

Year	Transgenic	Non transgenic
1995	-	8
1996	5	11
1997	12	23
1998	18	18
1999	28	13
2000	19	7
2001	32	3
2002	13	2
2003	9	-

Source: INASE

Table 3 – Quantity of maize hybrids registered by event (1995 – August 2003)

Year	Total	Conventional	IMI (non- GMO)	Transgenic					Total Transg
				LL	E-176	MON 810	BT 11	MON 810 + IMI	
1995	34	33	1	0	0	0	0	0	0
1996	33	32	1	0	0	0	0	0	0
1997	47	46	1	0	0	0	0	0	0
1998	42	32	2	2	3	3	0	0	8
1999	58	39	10	0	3	6	0	0	9
2000	49	31	3	1	0	12	0	2	15
2001	82	51	1	0	1	29	0	0	30
2002	55	36	2	0	0	14	3	0	17
2003	39	24	1	0	0	10	2	2	14
Total	439	324	22	3	7	74	5	4	93

Source: INASE

The incorporation of biotechnology in the major crops has led to the broad expansion of the agricultural frontier (six millions hectares in the past ten years) and the movement of soybean cultivation to new areas not previously cultivated has been witnessed; with Bt maize late seedings may be made, known as second seedings, or second cultivation after wheat owing to the resistance to lodging indirectly supplied to it by the transgene, and thereby also increasing the opportunities for cultivation.

Not only the agricultural sector has benefited from the introduction of biotechnology but the whole of society.

Biotechnology has been introduced so as to provide an understanding of the importance of the recognition of intellectual property for the proper management of such technology and also an understanding of the need for a company such as RELMO to have license agreements for the use of genes, by way of example of the commercial prevalence of those enterprises

commented on in Table 4, which market maize hybrids with the MON 810 gene, soybean varieties with the RR (Round up ready) gene, and cottons with Bt gene. A licensing policy may be noted on the part of patent owners, which has allowed numerous national or multinational companies to incorporate those genes in their commercial lines.

Table 4 – Companies participating in the national GMO market, origin and crops on the market

Soybean tolerant of glyphosate:

Company	Origin	Varieties
Don Mario	<i>Argentina</i>	8
Relmó	<i>Argentina</i>	8
Nidera	<i>Multinational Argentina</i>	28
Seminium	<i>Argentina</i>	
Syngenta	<i>Multinational</i>	5
Monsanto	<i>Multinational</i>	9
Pioneer	<i>Multinational</i>	
Santa Rosa	<i>Argentina</i>	
Agriseed	<i>Argentina</i>	

Bt maize (resistant to insects):

Company	Origin	Hybrid
Don Mario	Argentina	3
Sursem	Argentina	
Dow	Multinational	
Nidera	Multinational Argentina	14
Monsanto	Multinational	16
Pioneer	Multinational	
Syngenta	Multinational	5-2
Seminium	Argentina	
Multisem*	Argentina	

Bt cotton (resistant to insects):

Company	Origin
Genética Mandiyú/ Monsanto	Argentina-Multinational

Source: ASA

1.1.6 Argentinian legal framework, Argentine Seed Association (ASA) and Association for the Protection of Plant Breeds (ARPOV)

The Argentinian legal framework, formed by Law No. 20.247 on Seeds and Phyto-genetic Creations which establishes the right of ownership of phyto-genetic creations, with entry in the Plant Variety Property Register, and by means of which the State guarantees ownership, has

* Introduced into the market in the 2003/2004 campaign.

been in force since 1978. The National Seeds Board (CONASE), a body set up by the Law on Seeds, comprises the seeds sector (ASA, ARPOV), the State (INASE) and users, and regulates the activities of the seed sector.

ASA, which has been in operation for 54 years and groups together the 67 main seed companies, and ARPOV, set up more recently, are the bodies which deal with sectoral union activity and work for the technological development and protection of phytogenetic creations. ASA, which is member of CONABIA, since it was set up 11 years ago, has played a major role in the discussion of the regulations which Argentina now possesses for the commercial release of a transgenic event.

Three years ago, the Association of Agricultural Technology Chambers (ACTA) was set up and groups together the sectors providing technological material for agricultural production, seeds (ASA), agrochemicals and fertilizers (Chamber of Plant Health and Fertilizers – CASAFE), veterinary products (Chamber of Veterinary Producers – CAPROVE) and agricultural machinery (Association of Tractor Manufacturers – AFAT), which has been acquiring major importance in agro-industrial production activities, and is the most important in Argentina.

As a result of the work of those institutions, Argentina acceded to the 1978 Act of the UPOV Convention and discussions regarding accession to the 1991 Act of the UPOV Convention are very advanced.

2. RELMO in Argentinian agriculture

2.1 What it is

RELMO is a company which continues the activities of the Ferrarotti Countryside Organization (OFPEC) which began working in the 1960s as the first company to devote itself to the genetic improvement of soybean, and the program registering the first Argentinian variety began in 1965. Mr. Julio Rafael Ferrarotti has just been rewarded as a pioneer of the improvement of the cultivation of soybean by PROSOJA, an organization which brings together Argentinian soybean breeders.

RELMO is a typical family company belonging to the Ferrarotti family. Julio Rafael Ferrarotti is the Chairman of the Board of Directors, his eldest son Julio Silvio is the Vice-Chairman and is in charge of the Research and Development Department, and his other son Juan Manuel is in charge of the Marketing Department. I am the only member who does not belong to the family, I joined the company in 1992, and I am currently Director, and deal with new business and international and institutional relations.

This company keeps the traditional initial approach to the seed industry, with the main experimental field operating in the Ferrarotti family farm, located in Maciel, Sante Fe Province, in the Argentinian corn belt.

2.2 What it does

RELMO is exclusively devoted to the business of seeds for the major crops soybean, wheat and maize. Its activities are conducted throughout the whole Argentinian agricultural and livestock industry. Its central offices are in Rosario (Santa Fe), a major grain marketing and

soybean grinding center, in addition to being a major seed export port; the most important soybean producing-exporting center in the world is to be found in an area with a radius of 200 km around Rosario.

2.3 Intellectual property as a basis for RELMO's business

RELMO's development in the past few years is based fundamentally on license and service agreements which are supported by intellectual property. For many years, seed companies' activities were governed by the concept of vertical movement, encompassing all the cycles (genetic improvement, seed production and marketing), which could be defined as an isolated autarky. Plant varieties were thus developed, produced and sold. The exchange of experiences was rare and the predominant culture one of isolation.

Development is now horizontal with interaction between companies licensing products, carrying out joint development, providing services and so on. This is possible to a large extent through the practical application of intellectual property rights developed in the past few decades. The advantages are well known and allow technology to be disseminated more rapidly, with a synergy effect that benefits all the sectors involved. The dissemination of transgenic events not only did not hinder this process, but also made it more rapid and the flow of germplasm increased notably.

In the past few years, RELMO has transferred by license to other companies, not only in Argentina, a total of eight varieties and, in turn, has marketed eight varieties with its own trademark also, four of which are part of the current commercial line. This exchange of varieties between companies is possible as part of the legislation guaranteeing ownership of the varieties. What is licensed is commercial use, while the licensing company retains ownership.

2.4. Relations in Argentina

2.4.1 With biotechnology companies

RELMO is a pioneering company in the genetic improvement of soybean in Argentina, and for years its main activity. The commercial liberation of the RR gene; this constituted a major challenge, above all, in terms of its rapid adoption by producers. In this context, it was necessary to prepare for the replacement of all the varieties we had on the market with RR varieties as quickly as possible. This in itself already constituted an extraordinary effort. In the first stage, licenses were obtained for varieties from other companies which had already incorporated the gene in their improvement programs. If it had not done so, RELMO should have waited to incorporate the RR gene in its germplasm, something which takes time, and then at that time market RR varieties, thus losing its market position. This fact is further evidence of the application of intellectual property law, and some of those licensed varieties were introduced from abroad, thereby confirming what we said before, namely that biotechnology accelerated the exchange of germplasm between companies, which in turn began to explore the possibility of new business deals since they had a commercial relationship for this reason. The fact that foreign companies have transferred their varieties to RELMO for commercial exploitation purposes demonstrates the credibility of the system of ownership of phylogenetic creations, which the State guarantees through the Law on Seeds and the Plant Variety Property Register.

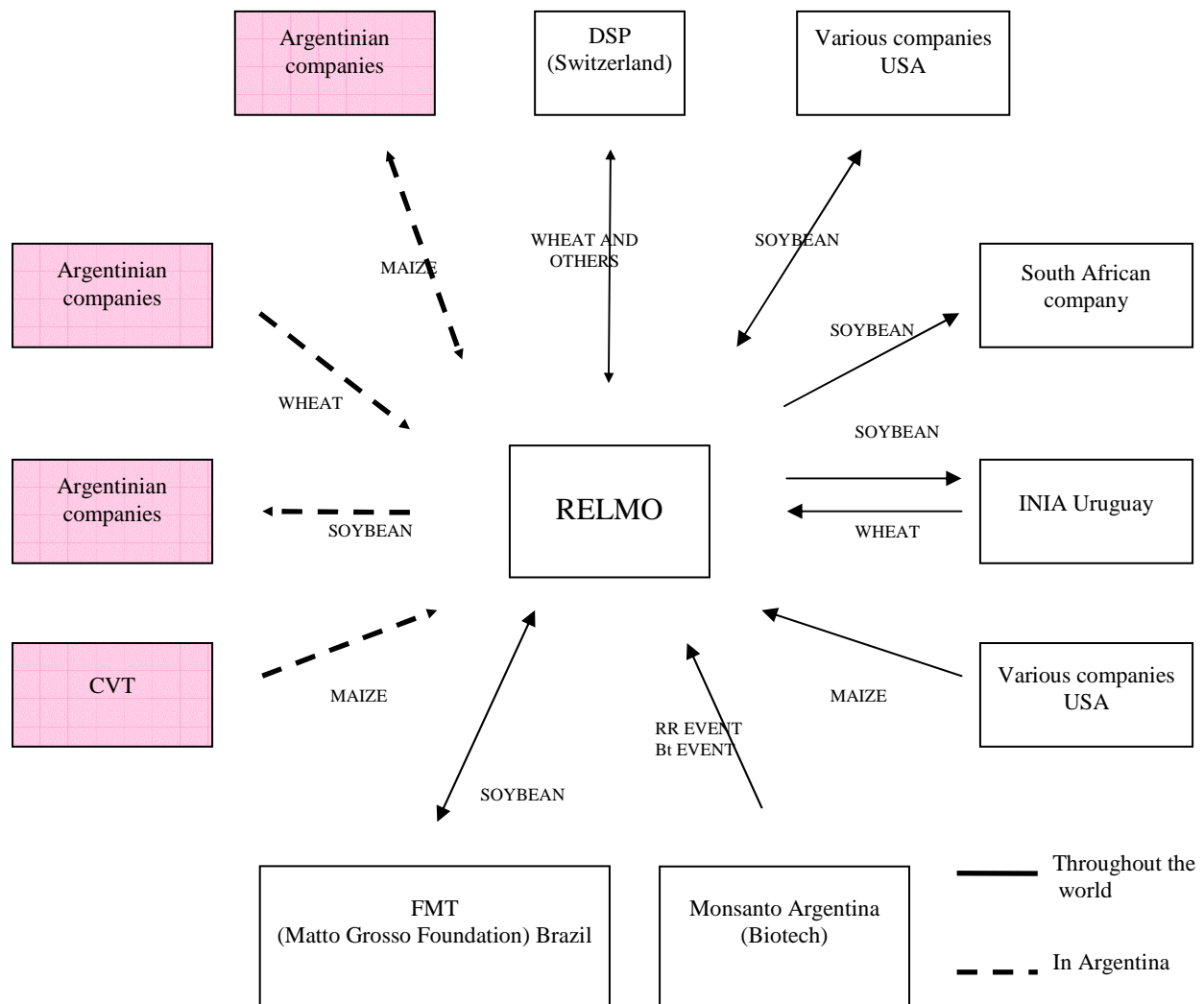
In order to commercialize RR varieties in Argentina, it was necessary to reach an agreement with Monsanto so that we were authorized to use the RR gene. The same was done on the basis of reasonableness which allowed RELMO to compete in the market, although it had to adapt its production and marketing systems to new models. This agreement also allowed us to place our soybean varieties in other countries.

The high degree of adoption of transgenic forms of maize has already been mentioned, for which we have begun working with the Bt gene (MON 810 event), having signed a testing agreement with Monsanto. We have also agreed the commercial license conditions which envisage various alternatives for using the technology. Given the nature of this Symposium, it is interesting to comment on the way in which we are planning our maize business. On the one hand, we take the Bt gene and germplasm which we license from other companies in order to form the hybrids which we will market. The MON 810 gene is protected by the Law on Patents and germplasm (inbred lines) by the Law on Seeds.

2.4.2 With other seed companies

RELMO has licensed soybean varieties to various companies for a number of years. It has taken under license varieties of wheat and licensed maize hybrids to companies operating in the domestic market. Graph 6 shows this flow of licenses.

Graph 6 – Flow of licenses and services



2.4.3 With public institutions

Last year, RELMO concluded an Agreement on Technology Transfer with the National Institute of Agriculture Technology (INTA) of Argentina, with a view to the genetic improvement of subtropical germplasm of maize. This is an interesting example of cooperation between the public and private sectors which thus enhance their capacities. The Agreement operates as follows: INTA provides the germplasm – which it owns -, the installations and the technical staff, and RELMO covers the operating expenditures. The hybrids obtained are marketed exclusively by RELMO which pays INTA a percentage royalty for what is marketed. RELMO thus has access to very good germplasm and a high level of technology, and INTA collects the royalties produced by the sale of hybrid seeds.

The inbred lines used in the production of hybrids are the property of INTA and commercial exploitation is exclusive to RELMO which may license such exploitation to third parties, while respecting the royalties received by INTA; the flow chart (Graph 6) therefore shows that RELMO takes maize hybrids from the Agreement with INTA, which it licenses in turn to other companies, in addition to producing them with its own trademark.

2.5 Relations throughout the world

2.5.1 With the National Livestock Research Institute (INIA) of Uruguay

The National Agricultural Research Institute (INIA) of Uruguay has one of the oldest wheat breeding programs in South America and is located in an area with a high incidence of fungus and virus-related diseases, which allows it good selection pressure. RELMO obtained licenses of varieties from that program and last year INIA granted RELMO exclusive representation for its wheat in Argentina. In turn, RELMO did the same with soybean, granting INIA exclusive rights over the licenses for its varieties for Uruguay. The varieties of wheat are owned by INIA and RELMO exploits them commercially in Argentina. It is worth explaining that this license agreement allows RELMO to enter the wheat seed market with adapted varieties at a cost probably equivalent to that of developing its own crops, with the advantage of time (the development of a new variety takes six to eight years). Testing and registration costs within the seed certification system are covered by RELMO. The advantage for INIA of Uruguay is the expansion of the potential market and a reduction in cost for each variety obtained. For RELMO, this is a very good commercial opportunity, since the incorporation of seeds of winter crops means that the sales structure has a longer period of occupation and also benefits considerably the cash flow; we reiterate that for years the main business focus for RELMO has been soybean sown in summer.

The scheme of licenses for soybean varieties to INIA, with a view to their marketing in Uruguay, follows the same principles as those commented on for wheat.

2.5.2 With *Delley Semences et Plantes* (Seeds and Plants) S.A. (DSP) of Switzerland

We have established a commercial relationship with this company in Switzerland, which includes licenses for varieties of wheat for the whole of South America and technical collaboration, including the training of RELMO staff in Switzerland. As commented on in relation to the Agreement with INIA, the varieties here are also owned by DSP and RELMO is responsible for commercial exploitation. About four years ago varieties from France were introduced into the Argentinian market by one of the important companies with very good marketing skills and which was widely accepted by producers. These French varieties require different technology for cultivation than for the Argentinian varieties, and they constitute a differential share of the wheat seed market; this license agreement has allowed RELMO to participate in the market with varieties of a similar profile to the French varieties.

2.5.3 With the Matto Grosso Foundation (FMT) of Brazil

Brazil and Argentina constitute the major sector for the production of soybean in the world and the genetic improvement of the crop is very developed. The Foundation is an important technical support for the crop in Brazil, where approximately 16 million hectares are cultivated. We have established a program of work which includes the joint launch of varieties of soybean and which is carried out in both countries. Contrary to the previous agreements, this joint project does not involve any licenses but an ambitious joint development of varieties and research on disease resistance, as well as cultivation technology. Brazil and Argentina already represent the major region in the world for soybean production.

2.5.4 With South African companies

First, we have granted licenses for conventional varieties, and more recently for RR in the country, thereby contributing to the development of the crop. As in previous agreements, RELMO is also the owner of the varieties in this area and a South African company exploits them commercially.

2.6 Conclusion

Graph 6 also shows the meaning for RELMO in terms of development of the relationship with other companies, something which is possible only with a legal framework ensuring respect for intellectual property, in our case the ownership of phylogenetic creations (varieties or lines), and provided that a scheme of seed certification exists allowing those tools to be used.

The extremely important role which institutions such as UPOV have played and play is highlighted by their actions which have contributed to countries acceding to its ACTS and adopting the principles allowing the development of companies, as we have shown in the case of RELMO. We attach great importance to these activities as shown through active participation in Argentina by the Association of Argentinian Seed Producers (ASA), which is also a member of the Board of the International Seed Federation (ISF).

We also participate in the Argentinian Association of Protection for Plant Breeds (ARPOV) which deals with the defense of rights and currently plays an important role in the collection of royalties for wheat and soybean. This has recently been implemented and constitutes a significant advantage for a company the size of ours, since it provides the possibility for collecting royalties in that ARPOV has the structure necessary for such monitoring and collection work.

It is interesting to discuss the advantages and opportunities on the one hand, and the disadvantages and shortcomings on the other, of a medium-sized company in the current context characterized by merges which give rise to companies ever greater in size in the biotechnology era.

The main advantage, of no little importance, is that the RELMO executives are its owners, which allows decisions to be taken quickly and direct treatment to be provided in the company's relations both internally and externally. Another advantage, which has nothing to do with the size, is that the company policy is to move forward quickly and very actively in business management.

In relation to events of importance such as that of the RR gene in soybean, the main disadvantage appears to be that of non-access to licenses for its use, which in Argentina would leave us outside the market, a situation which has not occurred so far, not only with this event but also with others more widely disseminated, as we have already commented.

Probably the major problem lies in the difficulty in developing our own transgenic events or those with shared ownership or exclusive commercial exploitation, since the relationship with public institutions or biotechnology companies would allow those developments to be faced jointly, the main problem being the high cost of the deregulation processes required for its commercial release. The companies devoted to biotechnology developments have whole departments dealing solely with this subject. We hope that in future services will be provided by companies specializing in commercial deregulation of transgenic events.

I would like to emphasize by repeating again that without national legislation and an appropriate international framework for intellectual property, the development of a company such as RELMO would be very difficult if not impossible.

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