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Clara Craviotti

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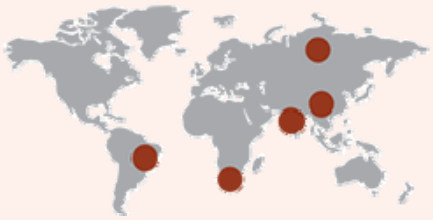

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by Clara Craviotti

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Abstract

From 2000, onwards a growing trend of internationalization of Argentinian firms has emerged, with neighbouring countries as a main focus, particularly Brazil. Agricultural production (particularly "flex crops", such as soybean, linked to the new food-fodder-fuel complex) has constituted a central point of their business. Taking the case of the seed industry, this paper explores the impact of the creation of Latin multinational firms on shaping agrarian transformations and the style of development adopted by both countries involved. It analyzes the importance of the expansion into Brazil for the firms of Argentinian origin in terms of taking advantage of investment opportunities; their ability to develop an inward and outward-oriented action network as well as the tensions involved in these configurations. The analysis suggests the need for contextualizing interpretations that focus only on North-South flows and for identifying the role of national elites in shaping current agrarian transformations.

Keywords: Argentina; Brazil; soy production; seed industry

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1 Introduction

The place occupied by agriculture in our modern societies, which are characterized by their high degree of urbanization and division of labour, has recently raised significant interest from academia, governments and the public. After several decades in which the debate on the agrarian question seemed overshadowed, issues such as the increase in prices of staple foods or the process of foreign investment in land purchased in different countries, has put it back on the agenda, not only for their implications on consumption and food security, but also because of the unequal forms of benefit appropriation involved.

These phenomena emerge from structural trends occurring in the last decades that are reshaping global agrifood systems – albeit with different nuances in each country, and the respective development of the agricultural sector. Just to record some central tendencies that should be highlighted: the growing integration of agribusiness activities into global value chains; their high concentration, particularly in the upstream and downstream sectors; the affirmation of a new technological paradigm driven by biotechnology; and the emergence of new forms of governance that involve the consolidation of private forms of regulation. These aspects have led to a regime that some authors characterize as corporate, although it involves internal tensions and contradictions (McMichael 2009).

Among the most recent trends, it should be stressed that the there has been a growing demand for protein by emerging countries and an expanded usage of biofuels. The latter has increased the interest of financial capital, traditionally reluctant to illiquid investment, to be positioned in the commodities and rural assets markets. From another point of view, these same factors situate countries that are net exporters of these products – and especially of *flex crops*[1]– in a strategic place. Their expansion, in some cases, involves a change in the development model that some authors conceptualize as *reprimarization* (Bastian and Soihet 2012), and from a more radical perspective, as *neo-extractivism* (Gudynas 2012). [2]

If on one hand this development model is based on important natural resource endowments, on the other, recent processes of productive restructuring sustain it. Technological and organizational innovations, which include the formation of multilatin firms[3], are of particular interest, as they are driving forces of these processes.

In this context, this paper aims to illuminate how the strategies of these firms are linked with the style of development of the Southern Cone countries and their insertion in the global division of labour. It considers the factors that enabled firms coming from MICs countries – as is the case of Argentina – to shape the agricultural development of BRICS countries, particularly Brazil (in contrast with approaches that often reveal the inverse relationship).

The aim is to deepen the acquaintance of the internal features of development of these firms, i.e. the main steps they experienced, the rationale behind their expansion and the business model adopted, paying attention to the mechanisms employed in accessing key resources. However, a focus was put on the relationship between firms and territories, understanding the latter not as mere physical spaces that sustain productive activities, but as complex networks of both public and private actors with whom these companies

[1] These are agricultural products that can be used as food, feed and biofuels, and which can be changed flexibly according to circumstances (Borras et al. 2011). In the MERCOSUR countries sugarcane and soybeans are particularly illustrative.

[2] Following the aforementioned authors, *reprimarization* is characterized by increasing the share of primary and manufactured products with low value added and/or with low technological content in exports. *Neo-extractivism* is considered as a style of development based on the appropriation of nature, which sustains a barely diversified productive structure and the insertion of a country in the world economy as a provider of raw materials, although the state plays an active role and redistributes some of the surplus generated.

[3] A *multilatin* or *global latina* is a company with origin in a Latin-American country that has value-added operations outside its country of origin (Cuervo-Cazurra 2010).

interact in selective ways. The relationship with local areas is complex, not only because companies use different territorial resources, but also because the characteristics of these areas affect, and may even condition, their strategies.

Seed companies belong to a sector rarely analyzed when it comes to intra MERCOSUR relations, despite the fundamental role of the seed industry for configuring farming practices based on the control of nature, homogenization and standardization (Hubert et al. 2013). It also legitimizes a division of labour between the *innovative* researcher, who conducts tests on an artificial medium, and the farmer, considered as the *user*. In contrast to this model, there is another of territorial-participatory nature that relies on alternative farmer networks, generates plants appropriate to specific farming practices, and valorises intravarietal diversity (Bonneuil et al. 2006). One seed firm has been considered for in-depth analysis in the context of this research because of its growth in the MERCOSUR countries.[4]

Accordingly, this document is organized in the following four sections. The place of MERCOSUR in the current international context and the factors that favoured the growing export of flex crops are analyzed in the second section. Then a brief historical context of the internationalization of Latin American firms is outlined as a starting point for featuring in the fourth section some dynamic local actors in the last decade, such as seed firms. Finally some concluding remarks are presented.

2 Brazil and Argentina as cornerstones of the MERCOSUR food sector

Brazil and Argentina are prominent players in the world ranking of food exporting countries, and largely explain the position of MERCOSUR in this field. Both represent over 75% of the regional agricultural trade (Constantino and Cantamutto 2010). By the mid-2000s they were on the top of global exports of either raw, oil or meal soybeans; sunflower oil and meal, beef and poultry meat, sugar, concentrated orange and lemon juice, among other products (Gutman and Lavarello 2006). In addition, Brazil is the largest ethanol exporter worldwide.

Their leading position has not changed in recent years and even has strengthened in regard to some products. Indeed, in the last four decades South America was the region that recorded the fastest growth in soybean production, mostly through the expansion of the cultivated area. The latter increased by 30 times from 1960 to 2010, and showed a pronounced growth since the approval of transgenic soybeans.[5] The expansion of soybean cultivation has involved the replacement or displacement of other agricultural products and changes in land use, advancing over natural forests. It can be argued that in a few decades the process has implied a reorganization of the South American territory from the productive point of view (see Figure 1 below).

With about 47 million hectares devoted to this crop in 2010 (Catacora Vargas et al. 2012), the MERCOSUR is now the main soybean production area worldwide. In Brazil, the first crops for commercial purpose were cultivated in the 1940s, mainly on small properties (Campos Mesquita and Lemos Alves 2013). But cultivation progressed very slowly and soybeans were mainly allocated for self-consumption. In the mid-1950s, and because of government promotion of wheat, soybeans were encouraged as a rotation crop (Wesz Jr. 2014a). In Argentina, soybean production had an almost experimental character until 1960 due to climate issues, the low diversity of imported seeds and difficulties with weed control (Martinez Dougnac 1994). As

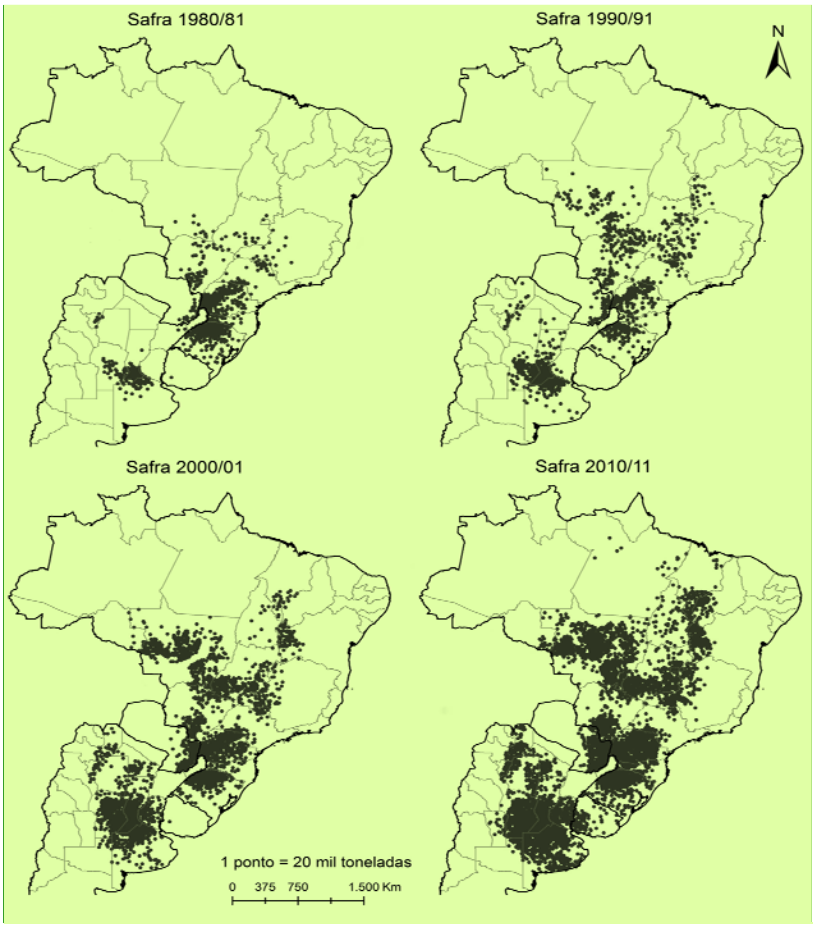
[4] Data were derived from in-depth personal interviews carried out in 2014 with several actors of the national and municipal public sector, technicians and company officials; the collection of articles published in Argentinian newspapers and magazines during 2005-2014; relevant documents (including some produced by the firm), and statistical data.

[5] According to Catacora Vargas et al. (2012), who considered data for a twenty year period, productivity in the Southern Cone has been remarkably varied, either with conventional and GM varieties.

in Brazil, its development became a complement to wheat with a doubled annual crop cycle.

Changes in the world market situation influenced the expansion of the crop in both countries: On the one hand, the temporary moratorium of US soybean export established in the 1960s, and on the other, the shortage of Peruvian anchovies, the main source of fishmeal used by the feed industry, which occurred in the 1970s (Catacora Vargas et al. 2012). From 2000, the significant increase in demand from emerging countries and the expansion of biofuels fostered production growth.

Figure 1: Evolution of the area planted with soybeans in the MERCOSUR countries



Source: Wesz Jr. 2013

Today, Brazil represents 53% of MERCOSUR soybean acreage, while Argentina 36% (SIIA 2010; IBGE 2010). Beyond the role of both countries in soybean production, there are significant differences in how the value chain is shaped, and a different level of specialization that affects their respective vulnerabilities to external shocks. In Brazil, the 1996 Kandir Law eliminated a tax affecting exports of raw materials and kept the tax burden on industrialized products (Wesz Jr. 2014a). Consequently, in 2010, 65% of soybeans were exported, 65% of them non-processed (ABIOVE 2010). While Argentina has had export taxes on grains since 2002, these taxes benefit value-added products and encourage local processing. That same year, 77% of soybeans were exported, 57% as flour and 12% as oil (CIARA, 2010). Also, national companies have a greater weight in Argentina, since they control over 30% of exports of flour and soybean oil (Wesz Jr. 2014 b). However, the interest of China, its main market, in advancing in the industrialization process through investment in processing facilities, could influence local strategies decisively.

While in Argentina the soybean complex provided 25% of exports in 2012 (INDEC, 2012), this figure was only 9% in Brazil, given that iron is the most important product (ABECEB 2011). In this year, the share

of agricultural exports (primary and manufactured) out of total exports was 33% for Brazil, while amounting to 53% in Argentina (Bartesaghi 2013). Beyond these differences, soybean production contributes significantly to trade balance stability and for obtaining foreign currency in both countries.

From the geographical point of view, soybean cultivation developed first in the south of Brazil (the states of Rio Grande do Sul and Paraná), and later expanded to the centre-west and centre-north of the country, to the area known as *Cerrados* and part of the Amazon region. Consequently in 2010 "traditional" southern regions accounted for only 37% of the cultivated area (APROSOJA 2011). In Argentina until the 1990s, soybeans remained confined to the Pampean region and afterwards spread to the northwest and northeast. However, the Pampean region still represents 85% of the total (SIIA 2011).

In Argentina, the proximity of soybean processing plants to the main producing area and export ports allows for lower logistic costs. Brazil has a drawback in this aspect and in relation to the need of fertilization; it also lacks a supply of machinery contractors. Nevertheless, the absence of export taxes and lower land costs improve returns in the Brazilian case. More precisely, the availability of large uncultivated areas in the Cerrados appealed to private investors seeking to expand their production scale.[6] It must be kept in mind that a few decades ago the area was not suitable for grain production. The involvement of different government agencies was critical for the territorialization of agribusiness (Gras 2013). First, through the state owned company EMBRAPA (*Empresa Brasileira de Pesquisa Agropecuaria*), who developed fertilizers that allowed reducing soil acidity in the savannah/Cerrados, and soybean varieties adapted for the tropical weather and a shorter photosynthesis period. Other contributions from the government materialized in roads and irrigation infrastructure, as well as low-interest loans to producers. Some of the states of the *Cerrados* also have tax incentive programs to attract modern agricultural producers and business ventures (Campos Mesquita and Lemos Alvarez 2013).

In the case of Argentina there was no public support of this magnitude for the development of the crop in the "new" areas. But the emergence of the technological package based on the combination of transgenic varieties resistant to glyphosate herbicide and no tillage was crucial.[7] An exceptional wet cycle also contributed to the displacement of the agricultural frontier.

A set of public policies and circumstances initially enabled Argentine producers to access the key input, genetically modified seeds, around which the technology package is based. On the one hand, the official approval of glyphosate-resistant soybeans occurred in Argentina almost simultaneously with their release in the United States (1996). The area sown with genetically modified (GM) soybeans increased from less than 1% of the total soybean planted area in 1997 to more than 90% in 2002, a rate of adoption considered higher than the one reached in the US, the first country to introduce this technology (Trigo and Cap 2003).

This widespread adoption was facilitated by the self-pollinated nature of the seed, whose reproduction does not alter its initial characteristics, and the strategy followed by the seed companies for a rapid dissemination of this technology. The first application to the National Commission for Knowledge and Use of Biodiversity CONABIA – a public body formed by members of the state, the industry and the scientific community – to conduct field trials of GM soybean varieties was presented by the company Nidera in 1991.[8]

[6] In 2011 the price of land was $ 17,000 USD on average for the core region of the province of Buenos Aires (Argentina), compared to USD 5,014 for the core region of the state of Mato Grosso in Brazil (source: Compañía General de Tierras, Argentina; IBGE, Brazil). However, its pace of growth is more pronounced in Brazil, a fact related to the incorporation of new areas for cultivation.

[7] This generated what some authors call a new technological paradigm (Bisang et al., 2008). Other approaches consider biotechnology as an element that reinforces the model driven by the Green Revolution, particularly through increasing the size and scope for agrichemical markets (Sorj and Wilkinson 1994).

[8] Nidera bought Asgrow Argentina in 1988 and started its activity in the area as Nidera Seeds. Asgrow International had had access to the Monsanto technology by an agreement between the two companies in the late 1980s in the United States (Brieva 2006).

Monsanto could not patent the gene that confers tolerance to glyphosate in the country because the technology had already been "freed" (Fuck and Bonacelli 2009). This, together with the possibility to use farm-saved seeds (a right recognized by the Argentinian legislation) allowed the rapid diffusion of new technology.[9] The lower operating cost that the new package enabled was a motivation for its adoption because the economic policies implemented in the context of declining international grain prices pushed local farmers towards cost-saving strategies (Craviotti 2002).

While this was happening in Argentina, Brazil did not allow GM seeds until 2003.[10] Nevertheless, producers from the southern states obtained seeds illegally from Argentina. Before the final approval of the glyphosate-resistant soybean by Law 11,105 in 2005 (the Biosafety Law), the government had already authorized grain marketing of GM soybeans in 2003/04 and 2004/05 through provisional measures (Fuck and Bonacelli 2009). Ten years later it is estimated that GM soy occupies 92% of the area planted with this crop in the country.

With the official release of GM soybeans there was an increase in the number of registered varieties in the Brazilian market. In Argentina, after an impasse from 1999-2003, the administrations of Nestor and Cristina Kirchner resumed the path of support for biotechnology with the approval of new traits and the enactment of Law 26,270 for the Promotion of Development and Production of Modern Biotechnology in 2007 (Idigoras 2013). The situation is converging towards harmonizing biotech approvals between both countries. They also developed joint efforts with the Chinese government for the approval of the new RR seeds known as Intacta (*El Tribuno* 29/12/2013).[11] All this brings about the strengthening of a particular production model and insertion in the international arena.

In addition to public policy, a central fact for the strengthening of a productive scheme based in GM soybeans has been the development of local companies who based their accumulation strategies on them.

3 The development of Argentinian multilatin firms

Outline of the process

The development of multilatin companies is linked to the phenomenon of globalization, which is accompanied by greater financial and trade flows, as well as by the internationalization of production processes (Schorr and Wainer 2014). While Argentina is far from the major Latin American economies (Brazil and Mexico) regarding the number and importance of internationalized firms, is undoubtedly part of this trend.

Different phases can be identified in the internationalization of Argentine firms: In the early twentieth century and in line with the country's role as the world's breadbasket, some local companies took a leading role through the establishment of overseas facilities. This trend continued during the import substitution stage but gained new momentum in the 1990s, a period marked by the implementation of neoliberal policies in the country. Faced with increasing competition among capitals, internationalization became a requirement (Kosakoff 2010). Also, the regional integration process that began in 1986 between Brazil and Argentina,

[9] Argentina adheres to the 1978 UPOV (International Union for the Protection of Varieties of Plants) Act. Under this legal framework varieties are protected by PBR (property breeders rights), which preserve the possibility of own use by the farmer and the free use of varieties for breeding.

[10] In June 1998 Monsanto applied to the Biosafety National Technical Commission (CTNBio) of Brazil to authorize the commercial release of Roundup Ready herbicide tolerant soybean. The Brazilian Institute of Consumer Defense (IDEC), Greenpeace and the Brazilian Institute of the Environment and Natural Resources (IBAMA) reacted to this request. Understanding that CTNBio had extrapolated its duties and authorized the cultivation of RR soybeans without the presentation of a preliminary environmental impact study, the authorization was suspended (Milanesi et al 2009).

[11] These seeds embody stacked GM traits (insect resistance and glyphosate tolerance).

which extended to other countries in South America through the creation of MERCOSUR in 1991, helped to make internationalization viable by removing barriers to trade (Belik and Rocha dos Santos 2002). At that stage, there was an outward expansion of some Argentinian companies, but also other local firms passed to external hands (Schorr and Wainer 2014).

With the marked devaluation of the Argentine currency in 2002, a new phase in the internationalization process began. Argentine firms expanded into other countries of MERCOSUR in the early stages of the soybean chain (the provision of inputs and primary production), giving rise to a completely new phenomenon. This process is undoubtedly linked to the growth in global demand, but it is also connected to the type of agricultural development adopted by these countries that these firms contribute to shape.

From a microeconomic point of view, the motive that led Argentinian companies to invest abroad was their will to seek new markets and to strengthen those gained through exports. To expand into other countries, they often have developed strategic alliances with local firms and multinationals. They do not differ substantively from the latter in their behaviour, so they prefer to establish operations in other countries through firm acquisitions that enable to shorten steps for the installation and capture of benefits (Kosakoff 2010).

Throughout these decades, a constant of Argentina has been the lack of financial or fiscal policy incentives, or of specific programs that promote the internationalization of local groups, as is the case with the BNDES (*Banco Nacional do Desenvolvimento*) in Brazil. Therefore, financing through the capital market is a key element for the internationalization of Argentinian companies. Other factors are their abilities to develop organizational schemes that allow them to focus on the activities in which they are competitive, and to manage marketing and logistics (Kosakoff 2010).

In this context, a survey of Argentine companies with operations abroad showed that they mostly expand to neighbouring countries, and that their size and level of internationalization are moderate. One third carries activities in sectors related to food production in which they have competitive advantages (Nofal 2011).

Some Argentine companies have positioned themselves differentially in the local map of actors, based on their ability to interpret the trends in motion in the food sector and to take advantage of them to strengthen their accumulation strategies. They designed operating schemes that crossed borders, but they also made adjustments to adapt to the conditions of the countries targeted by their investments. The internationalization of some leading Argentinian “sowing pools” is illustrative[12], as well as the case of seed firms.

Seed Companies

The input sector, particularly the production of seeds, is a clear manifestation of firms’ internationalization. There are technical aspects that favour this process: germplasm can be transferred between different areas and countries, and testing in different natural environments enables identifying the most suitable materials much better than a narrow range of ecosystems (Jacobs and Gutierrez 1985).

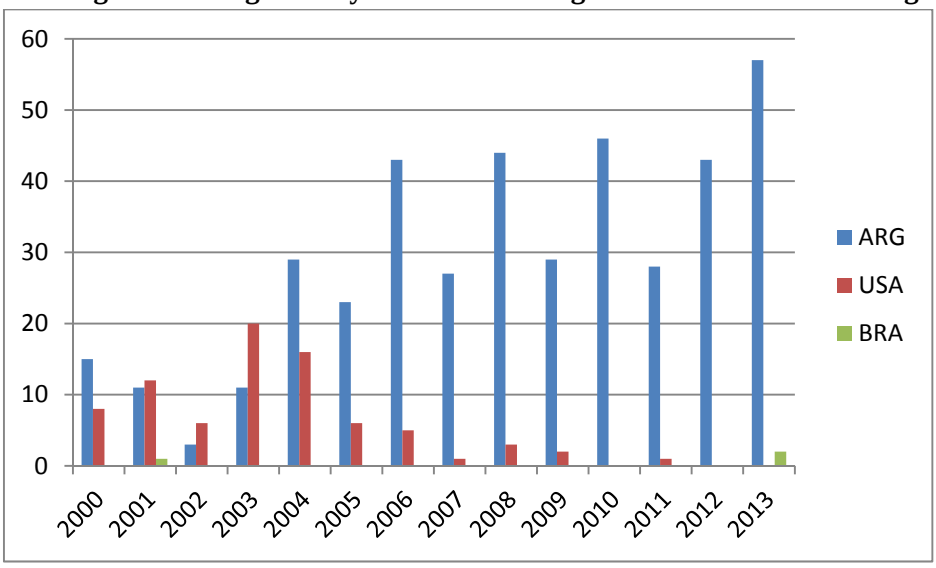
At a global level, the internationalization of the seed industry began in the 1970s and led to restructuring and acquisitions that deepened in the 1990s, with the integration of the hybrid seeds industry into the agro-chemicals industry. Concentration in the global seed market in the four leading firms increased from 28% in 1994 to 54% in 2009 (Fuglie et al. 2011). The costs of the innovation process and the possibility of appropriation of the results are relevant factors to explain economic concentration and the weight of the private sector in relation to the public sector.

[12] These are network modes of organization originally established in Argentina for grain production. They involve a flexible use of land, labour and machinery through outsourcing productive activities. The most important sowing pools have developed operations in other Mercosur countries and have fluid connections with financial markets.

In Argentina, research in soybean cultivation began systematically in the 1960s. It consisted of testing the adaptation of varieties coming from the United States, and to a lesser extent Brazil, to local conditions. It was carried out by state agencies (such as the National Institute for Agricultural Technology, INTA), and national firms (Jacobs and Gutierrez 1985). Most of these companies began working with American counterparts, who in addition to providing germplasm, developed cultivar tests in Argentina and the US, a strategy that allows a reduced time required for the development and diffusion of new varieties (Rossi 2006).

As years passed, breeding activity grew, and local companies started to do germplasm crossings. The result is that today the Argentine market is supplied almost entirely with genetics of local origin (see Figure 2 below). These varieties turned out to be the basis of the ongoing internationalization of some Argentinian companies.

Figure 2: Argentina. Origin of soybean varieties registered in the National Register of Cultivars



Source: The author, based on data from the National Registry of Cultivars

As for the public sector, it lost participation in research. According to Gutierrez and Penna (2004), this was due to its limited budget and difficulty in obtaining transgenic genes from the private sector. Brieva (2006) argues, however, that this was caused by INTA's institutional strategy of not competing with transnational companies (TNCs).

TNCs, meanwhile, did not initially show great interest in soybean breeding activities (Brieva 2006). Being self-pollinated varieties, harvested seeds can be used by the farmer without altering their qualities, a situation that implies narrower profit margins for companies. This not only extends the farmers' room for manoeuvre but also limits the ability of the private sector to increase the price of seeds (Interview Nº 8, 2014). Thus, foreign companies focused on seed production of hybrid corn, sunflower and sorghum, where there is a "natural" barrier against multiplication, forcing the farmer to buy seeds every planting season. Moreover, hybrid seed production is more costly and requires hefty budgets (Int Nº 8, 2014).

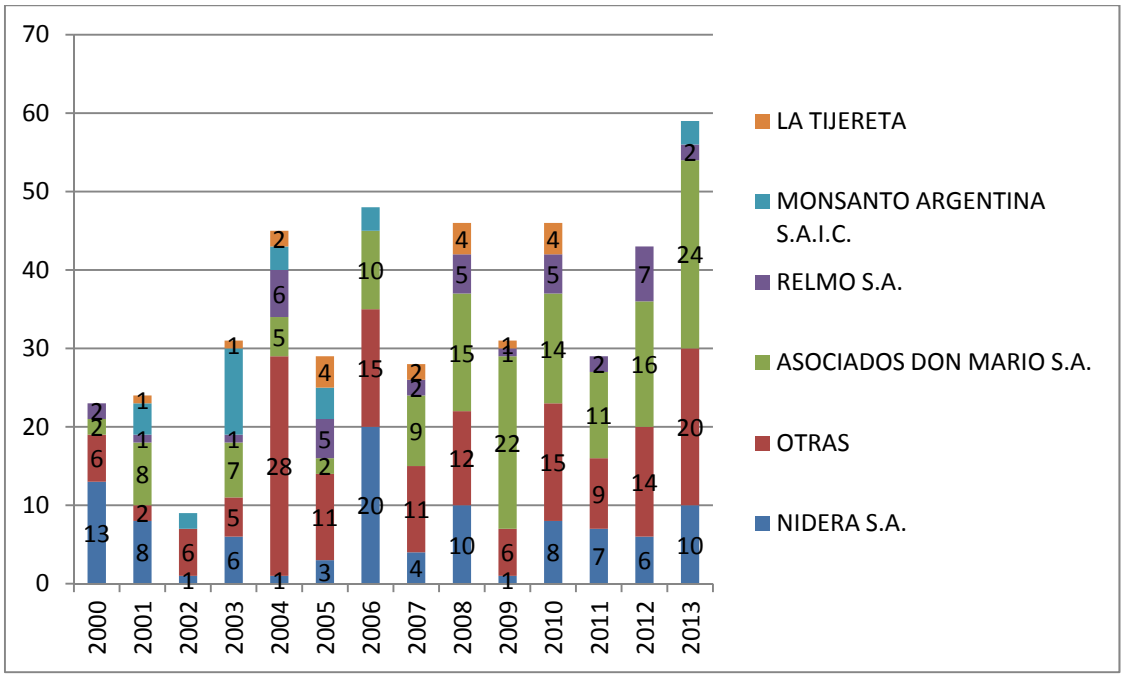
Despite these factors, in the last decade TNCs have evolved towards a greater interest in the Argentinian soybean market, a process that is linked to prospected changes in the regulatory context towards a greater appropriation of innovations. The case of Monsanto is illustrative in this respect. In the mid-1990s, the company bought a set of seed companies in Argentina (including Asgrow) but afterwards decided to discontinue its soy breeding program due to its disagreement with the Argentine regulatory system and the low percentage of legally sold seed (between 20-30% of the total according to different estimates). Yet the

firm resumed soybean research in 2012, referring to the agreements reached with other actors for the launch of the new RR seeds known as Intacta.[13] In 2008 the firm also acquired the local breeder, *La Tijereta*. Another multinational biotechnology company, Bayer, bought a local firm (*FN*) with soybean varieties in 2013.

It should be noted, however, that in an environment dominated by the production of GM soybean seeds, local companies that develop varieties establish agreements with biotech firms (usually TNCs) to add transgenic traits. Although there is some division of tasks between TNCs and local companies, whereby the first are leaders in the field of GM and the latter strengthen their position in the development of varieties, both segments are expanding the limits of their respective domains and redefining their practices towards increasingly network-type configurations (Lengyel and Bottini 2011).

The evolution over the last 15 years of the Argentinian register of cultivars (RNC) shows a marked mobility of companies in the soybean sector, although a couple of them hold a more stable position. In particular, a national firm (*Don Mario*) holds a leading role today. Next in importance is *Nidera*, a company of Dutch origin, which has been partially owned by the Chinese state-owned firm COFCO since 2013 (see Figure 3 below). Only two companies control 90% of the market and cover the entire range of the varieties grown in the country (Int Nº 8).\

Figure 3: Argentina. Companies with soybean varieties registered in the National Register of Cultivars



Source: The author, based on data from the RNC

A handful of Argentinian seed companies started to deploy an internationalization strategy in the last decade – *Relmó*, *Agseed*, *Criadero Santa Rosa*, *Don Mario* – with soybean varieties as flagship products. The factors that enabled the development and the mode of operation of one of these firms are described in the

[13] The vice president of the Argentinian subsidiary of the firm stated, *We perceive a clear commitment of the President to intellectual property and patents, to advance in new technologies in soybeans, which is where we want to advance further, besides corn (...) We are launching the Intacta technology in Brazil and we have decided to move forward in Argentina, because we are achieving the consensus that we were looking for (...) with seed, biotechnology companies, brokers, exporters, stock grain agents, i.e. the whole chain (...) who accepted the conditions to bring the technology* (Infocampo, 22 to 28/6/2012).

next section. The analysis will show how they help to shape the current map of soybean production, not only individually, but also through their interaction with other actors.

4 An Argentinian internationalized company

The origin and development of the firm

From 1973 to 2000, 344 soybean varieties were registered in the Argentinian RNC. During this period, Nidera led breeder shares (with 20%), followed by INTA (12.7%), Brett (7.2%), Don Mario, Monsanto, Pioneer and Eureka (18%) (Giancola 2003 quoted by Gutierrez and Penna 2004). In 2000-2013, and according to RNC data, the situation had changed: not only the number of registered varieties had increased – reaching about 500 – but the share of the public sector dramatically decreased, while the share of the private sector and two companies in particular, Don Mario and Nidera, grew.

Jacobs and Gutierrez (1985) argue that the use of surplus arising from agricultural production enabled the development of national breeders in Argentina. In the case of the firm considered by this research, it was originally born with the intention of engaging in grain production in rented land. It was integrated by a group of friends with a common social origin who brought together a small sum of money (USD 15,000). Some of them were agronomists.

In the beginning (1982), some members of their families gave them small areas of land which they rented in an in-kind basis, an arrangement that implies lower capital requirement and allows the distribution of risks between the farmer and the landowner.[14] Meanwhile, they performed testing of soybean varieties for a local, non-profit technical entity, the Argentinian Association of Regional Consortiums for Agricultural Experimentation (AACREA). This activity allowed them to perceive the advantages of short group varieties in which the company would later specialize.

Three years after they started as grain producers, firm partners decided to initiate the production of seeds through an American short group variety, Mitchell, which was then of public origin. The subsequent acquisition of the rights of this variety by a US company led them to seek contacts with seed breeders of that country. The positive response of a small American seed firm – which afterwards became a minority shareholder in the company – would result in what would be the first short group variety of American origin registered in 1990 in Argentina.

Taking this type of variety as a starting point, the firm pointed to a niche previously unoccupied by other local seed companies, and built a self-portrait as an innovative firm that faced *the challenge of navigating on the edge of a model, and making it the centre of a new paradigm*, thus transforming the existing breeding programs in Argentina (Don Mario 2005: 63). Short cycle varieties expanded in the Pampean region because they bloom before longer ones, they prevent the development of certain diseases (Sclerotinia), and they bring about higher performance. However, as the critical period of the crop comes earlier, they imply greater risks of drought. But just at this moment no tillage techniques started to develop in the country, helping to preserve humidity. *It started a merger between short group varieties and no tillage* (Int Nº 1, 2014).

The stage inaugurated in 1989 in Argentina, with the neoliberal Administration of President Carlos Menem, with its policy of encouraging foreign investment and the establishment of the parity between the Argentinian peso and the U.S. dollar, enabled the company to import machinery and varieties. The somewhat artificial stability of this period was particularly important in an activity where it takes about six years between the time when crosses between varieties are done and a marketable seed is achieved. During those

[14] This was a frequent arrangement at this time in Argentina. With the expansion of agriculture and especially soybeans, contracts between owners and tenants have evolved into forms based on advance cash payments.

years, the firm continued testing imported varieties and strengthened its presence in the market, thanks to a policy of alliances with TNCs. Through its agreement with a grain trader (Richco, later acquired by Glencore), the latter bought seeds from the company and paid them in advance. It also carried out seed marketing and financial assistance to farmers (Don Mario, 2005). This partnership lasted from 1992-1995, and was replaced by an agreement with Monsanto in 1996, which allowed the company's access to two key sources: the possibility to market seeds through the distribution network of the multinational company, and to add the RR gene into their varieties.[15] Thus it became the first company that registered transgenic short group varieties in the country.

The emergence of glyphosate tolerance soybeans dramatically changed the map of actors in the seed sector, and this early agreement with Monsanto brought indirect competitive advantages to the firm. In 1998, it bought another local company, Brett, whose value in the market had diminished because it could not establish an arrangement with Monsanto (Int Nº 1, 2014). The acquisition allowed the firm to expand its supply of varieties (until then limited to the Pampean region), and to achieve national projection, following the expansion experienced by the soybean cultivation area. At this stage the firm changed its structure from a limited liability company to a corporate company.

The post-convertibility period in Argentina radically modified the context. The devaluation of Argentina's currency increased the cost of royalties. Besides, the tougher stance of Monsanto regarding the Argentinian seed regulatory framework resulted in pressures on other companies and a potential threat. In fact, one of the American breeders that produced seeds in counter season publicly stated its decision to stop selling licenses in Argentina (*La Voz del Interior* 3/9/2004). The company decided to strengthen an in-house breeding program and to create its own sales network, since the agreement with Monsanto had ended in 2001. But on the other hand, the boom of soybean production in a context of increasing international demand and the repositioning of export-oriented production due to the devaluation of Argentina's currency, promoted the growth of the firm.

Around these converging factors the firm affirmed its vision of becoming a leader in soybean genetics. If in the 1996-2000 period it had only registered 4 varieties in the country, in the next five years the figure had risen to 24 (*Infobae*, 27/10/2006). The first variety one hundred per cent owned by the firm was registered in 2003 and it was a long group variety (DM 5800) (Don Mario, 2005). From 2004 the firm began a rapid territorial expansion of its testing network within and outside Argentina, and two years later it invested in a laboratory of molecular markers.

Since 2000, the firm has registered about 50 varieties in Argentina. But the upgrading towards the development of specific traits is not part of the plans for the near future. '*We still don't have the critical mass to sustain a project of development of transgenic traits (...) we don't have the business level required,'* stated its president (*Infocampo* 8-14/08/2014). It is estimated that in the case of soybeans, the development of a transgenic trait requires about 16 years and a 136 million dollar investment (Rocha and Villalobos 2012).

During this period the company not only grew in turnover in a more pronounced way regarding the convertibility period (sales rose from USD 20 million in 2003 to 120 million in 2013), but it also bought other firms in the seed sector, replicating the policy of large TNCs.[16] The firm developed a holding (group) structure which at present includes 10 related societies in Argentina and a similar number in its neighbouring

[15] Monsanto's development director stated: *Don Mario was one of the first companies to get the license, precisely because of its close relationship with Stine, which already had access to the genetically-modified seeds in the U.S.* (Don Mario 2005: 61). The company paid licenses during the early years; *at a certain stage Monsanto said it would charge for them no longer* (Int Nº 1, 2014).

[16] Between 2003 and 2004 the firm bought a 51% stake in SPS (dedicated to hybrid sunflower seeds), Forratec (forrage seeds) and Golden Harvest Argentina, devoted to hybrid corn seeds (*Infobae* 27/10/2006). Except Forratec, the other two were sold later to TNCs. In 2008 it acquired Areco Semillas oriented to non-GM soybeans (after named Kumagro).

countries, the United States, and South Africa.[17] It fostered its financial department, as on the one hand it created firms for the financing of suppliers, and on the other, it placed securities in the financial market to raise capital at a lower interest rate. The amount involved is relevant, since in 2014 it accounted for half of the turnover of the previous year. The possibility of incorporating new shareholders through converting into a stock exchange company started to be considered by firm owners. These decisions are due to the increasingly high amount of capital required for producing and processing seeds in Argentina, as well as for the investments involved for expanding in Brazil.

Indeed, during this stage the firm's internationalization process began, starting in 2001 with Uruguay and then following in other countries.

Organization: An external and internal network

The firm is organized in two large units, Brazil and LATAM (Argentina, Bolivia, Paraguay and Uruguay). Targets are set annually for these two big "territorial" units, which employ 300 and 400 people respectively.

It has developed an internal network, which as will be explained later, is used for seed production, and an external one consisting of alliances with other firms, some of them TNCs leaders in the provision of inputs. These networks involve the circulation of both tangible and intangible resources, and can be analyzed taking into account several dimensions: the position and room for manoeuvre of each actor, as well as the properties (stability, openness, spatial scope) of the network itself. Precisely, the creation of a network involves binding together actors who may be physically separate but share a set of rules and representations.

On the one hand, the firm has agreements with other companies for the collection of royalties. This is the case of Limagrain, a French company that acquired the firm's corn and wheat-breeding program, and of other companies such as LDC (Louis Dreyfus Commodities), Bayer and Syngenta (not Monsanto) that use soybean varieties registered by the firm.[18] On the other, the firm pays royalties for corn seeds (it sells Monsanto seeds under its own brand) since it aims to offer farmers a diversified seed portfolio, which is important from the commercial standpoint. It also has agreements with companies such as Monsanto and Dow in regard to transgenic traits.

As for networks abroad, the firm has established a joint venture with LDC in Brazil (Macroseeds) for the production and sale of corn seeds. In this country it also formed two joint ventures with Dow AgroSciences but only one (Tecnoseeds) remains. The purpose is investing in a hybrid corn processing plant with genetics coming from Dow. Both companies also have a partnership in Bolivia, for the production and marketing of soybeans varieties.

From a diachronic point of view, a change can be observed from an almost exclusive initial alliance with Monsanto towards a more diversified network, which includes other TNCs of a relatively lower relevance but with a growing share in the global seed market, as is the case of Dow. Current alliances seem influenced by two issues: First, the need for capital to strengthen the company's position in Brazil (the growth potential of this country's soybean area is much broader than Argentina's, but also corn is much more important as a crop, so the market demands presence in this category). On the other hand, the fluctuations of the firm's relationship with Monsanto, which have moved into the current tensions on how to capture the benefits of the new generation of RR seeds Intacta.

Indeed, and as the emergence of glyphosate tolerant soybeans radically changed the map of actors in the seed industry, ten years later the same is happening with the "stacked" soybean seeds. In this case Monsanto aimed to circumvent the legal vacuum in which the spread of RR soybeans had occurred in Argentina by ensuring the collection of royalties from the start. So it has articulated a network with some local breeders,

[17] For example shareholders lands, which were formerly part of the society, were excised from the group.

[18] Revenues from this item represented 26% of the firm's turnover in 2013 (Financial statements, 2014).

grain processors and exporters to ensure that the farmer pays a fee (royalties) to the biotech company for the transgenic traits at the moment of buying the seeds, if he/she chooses to keep them for own use. But the agreement of the actors at the end of the chain is central to value capture, since some of the latter agreed to undertake a test to detect the presence of these traits in the soybeans delivered by the farmer. The biotech company also tried to make the amount to be paid variable according to the productivity obtained, a system already in practice in Brazil.

All these aspects were questioned locally, forcing Monsanto to ease its initial conditions. Still, the low adoption of the new seeds brought about great hardship to the Argentinian firm, since it had heavily bet on varieties with stacked traits. In this context, *how can it be that a gene, a trait which ultimately brings is crop protection, makes you save, etc. gets the lion's share, and turns into whatever governs the whole marketing of my variety? It's crazy; we began to realize that very strongly when sales began* (Int Nº1, 2014). So the company is sustaining the idea of maintaining technological independence: *Today there are few independent soybean companies from the technological point of view, because they have been bought by multinationals that have their own platform. Don Mario has the vision of providing germplasm with technological independence and we will use the transgenic platform that we consider bringing more value to the farmer* (*El Tribuno* 10/14/2014). The firm president referred to the fact that besides the traits generated by Monsanto, there are also those by Dow, BASF and Bayer. But he also nuanced his position stating that *everything has a limit, because the [research] program becomes more complex when you manage many platforms*.

Although there are agreements between all these actors regarding the main issue, the collection of royalties from farmer-saved seeds, the relation between the breeder and the biotech company shows the asymmetries regarding their different access to resources and position in the network, since not just the latter is able to decide the way to go, as gains and losses are unequally distributed. Also the decision of the biotech company to resume its soybean breeding program in Argentina involves a possible change in the existing division of tasks, displacing breeders of national origin. Thus, a network articulated around the "first" RR gene eventually has reconfigured to result into a different one, where the binding factors are the contracts that guarantee the payment of royalties by the farmers.[19]

While the studied firm occupies a relatively subordinate position in its relationship with biotech companies, this is not the case of the internal network it has configured for seed production. Although it produces seeds directly on both owned and rented farms, it manages a larger production structure. Outsourcing allows the firm to expand with less investment.

First, it has agreements with *co-operators* who buy basic seeds, multiply, classify and sell them paying royalties to the company, which in turn controls the quality of the seeds. These agents may have land and processing plants of their own, but they also rent land and facilities to third parties, a situation that creates a "network of networks". About 150 co-operators would be linked to the firm in Argentina, although a small group multiplies the majority of seeds (Int Nº 1, 2014). From one point of view, these co-operators are partners, but they also compete with the firm to sell seeds, and in most cases they also sell other brands.

The company has also developed agreements with about 50-60 *multipliers* (farmers), to whom it gives

[19] Since 2000 some companies have launched private contracts in Argentina, which allow collecting extended royalties for farmer-saved seeds. Their argument is that the Argentinian seed law does not clarify whether the right to save seeds is free or the farmer must pay for them. They also favour changes in the seed law to ensure the recovery of intellectual property rights, restricting the right to save seeds to certain categories of farmers. The Argentinian Seed Association ASA considers the change of legislation as *a priority need for companies to gain competitiveness, particularly for those that do not have a portfolio of hybrid seeds*. It also argues that *a high percentage of R & D efforts in soybeans are being submitted for marketing approval in other countries of the region that have regulatory systems that recognize intellectual property. This also includes national companies, because it cannot be avoided that it is more attractive for them to obtain an approval for their products in foreign markets with adequate intellectual property systems* (ASA 2013: 43).

basic seeds and after buys the multiplied seeds at a "full" price (without transport and marketing costs), according to the soybean market in Rosario (Argentina), eventually with a plus that depends on the distance of the farmer to shipping facilities. In practice, the firm only acquires a portion of the soybean produced under these agreements, because it overstates the cultivated area to be able to choose the seeds according to their quality and the market situation. Farmers involved in these arrangements have been clients of the company for many years. But given their position, degree of atomization and relative access to resources, they are probably one of the weaker links in the internal network of the company. Co-operators are in a comparative advantageous situation since they fulfil multiple roles (production, classifying and selling of seeds), have a greater economic size and are better organized (some belong to an organization called CASEM, Argentine Chamber of Multipliers).

In recent years the firm's strategy has been to increase outsourcing through co-operators and to transfer to them the multiplication agreements with farmers. Now outsourcing represents 65% of production, although basic seeds continue being produced directly. This decision was influenced by the higher land prices and lower soybean prices, compared to the boom of previous years (Int Nº 3 and 4, 2014). It lightens production and financial costs for the firm and disperses risk in many actors. Therefore it illustrates the ability to "translate" the flexibility of a product capable of various uses (such as soybean) to the firm's internal organization.[20] On the whole, production on different plots throughout the country diversifies climate risks.

For the rest of the activities related to the industrial phase itself, the company has three seed classifying plants located in the heart of the Pampean region and a stake in a fourth plant located in the north-east of Argentina; it also hires processing services to third parties (may be the same co-operators, as they have idle capacity). In 2012, the company estimated that 80% of the seeds in Argentina were processed in rented plants.

In terms of marketing and distribution, the firm does not require exclusivity to sales agents. But producers are the real targets of the company (Quiroga et al. 2005). A comprehensive communication strategy is developed through the organization of "farmer days" with small groups, where the performance of firm varieties and those of the competition is compared; the participation in agricultural exhibitions; the organization of conferences and technical update meetings at its headquarters with major customers. The latter are also offered the new varieties. *They will go to the leading producers, those who they perceive as relevant. They begin to distribute bundles of seeds and they also conduct tests on their plots (...) the company has to settle so the producer starts to ask for the seeds, so that the multiplier begins to ask for them* (Int Nº 8, 2014). The marketing strategy of the company emphasizes the continuous improvement of products and their higher yields in order to encourage the purchase of new varieties instead of farmers' own use (Quiroga et al. 2005). Commercial, administration and finance areas are central to the firm, if one takes into account that they absorb most of its permanent staff.

Regarding research, behind each new variety released, the firm tests about three million potential varieties in its laboratories each year. After a selection process with molecular filters by ADN, half a million new materials are planted, to bring about just a few varieties each year (*Clarín Rural* 16/11/2013). In the initial development of this research program the link with US firms performing counter-seasonal tasks in Argentina was relevant (Don Mario, 2005). Today, counter-seasonal activities are organized by the company for its own purposes, mainly to speed up the production time of new varieties, and are carried out directly or contracted out. In terms of resources, the company devotes 15% of its turnover to its research program. Unlike other areas of the company, this section works as a single multinational team, which gathers information from the different locations where trials are conducted (Int Nº 5, 2914). It is arranged as a

[20] In contrast, producing and selling seeds directly enable a greater control over product prices and to sustain a more intense rhythm of introduction of new varieties. A disadvantage of outsourcing is that if the co-operator does not sell, the company does not collect royalties.

pyramid-type scheme, where at the end of the process, a few varieties are evaluated in multiple locations to decide which two will be released each year. It focuses on soybeans, as the company has disabled its corn research program. Concerning TNCs the initial gap was big, and has expanded over time (Int Nº 1, 2014).

In the current context, where the links between breeding and biotech companies are experiencing tensions in Argentina, either because of profit appropriation or the limitations of current transgenic traits, the characteristics of the research program reveal as strategic for the firm's future: *we have conventional varieties that were those existing before the traits (...) it is a very strong program because it enables us, if a new biotechnology comes up, we insert it there, because many times biotech companies do not have agreements; they don't let you put the trait by Dow on the RR of Monsanto. [The conventional program] now starts to be more valuable because there are resistant weeds; RR no longer has the same value* (Int Nº 1, 2014). It should be added that one of the firms belonging to the same holding is devoted to non-GM soybeans: it has developed both direct and contract production with farmers to whom it delivers seeds, monitors the crop and buys production at higher prices than those of GM soybeans (price differential ranges from USD 15 to 25 per ton). Although the volume managed is small, it has been growing over time, so the company is currently defined as the largest exporter of non-GM soybeans in Argentina (*Infocampo* 17-23/10/14).

Internationalization and importance of each territory in the firm's strategy

The internationalization of the company is deployed in different areas: in the capturing of new markets and in developing new varieties. Both are inextricably linked: a large scale of business justifies investing higher funds in research, while diversifying test plots in multiple regions allows for capitalizing on the experiences gained in other contexts and identifying the most suitable varieties for different environments, which can then be marketed.

The internationalization of the firm was gradual, and started by Argentina's neighbouring countries (see Figure 4 below). To settle in the new territories, the firm did not follow the usual strategy of TNCs involving the purchase of existing firms, but established agreements or partnerships with local entrepreneurs. *It was a good decision, as it allowed us to shorten the time from the institutional point of view (settlement in society) and from the operational point of view (know places for testing and improvement, variety registration, links to seed growers, etc)* (*Agropost* 2013). The narrative of the firm is that embeddedness is very important, so it barely moved some of its Argentinian staff to other countries, except for managerial positions, and carries out corporate social responsibility activities (donations to schools or health centres) in Argentina and Brazil.

Figure 4: The firm process of expansion

Source: The author, based on Don Mario (2012)

The Argentinian, or at most, *regional* character of the company is affirmed as an identity category, as opposed to big input or biotech firms: *We do not feel like a multinational, we feel regional. All the other companies are multi (....) biotech or have other products; they sell agrochemicals* (E Nº1, 2014). In the same vein the perception in the locality where its headquarters are placed in Argentina (a city of about 48.000 habitants situated in the heart of the Pampean region) refer to the local character of the firm, despite the fact that its owners are not born there: *everyone knows it, they started with a small office* (Int Nº 4, 2014). The

personalism of its president and owner also helps to differentiate the profile of the firm from big TNCs lacking a visible face.

As is the case with other seed companies, the process of expansion abroad took shape from the initial interest in the firms' products on the part of local input suppliers or owners of grain storage facilities. Also the sowing of GM soybean seeds smuggled from Argentina probably played a role. *In 2000 an owner of storage facilities of Uruguay came to visit us (...) and suggested that we provide soybean genetics* (ACDE 2012). This company would later become a co-operator and exclusive distributor of the firm products in Uruguay. In the case of Brazil, a former EMBRAPA soybean breeder contacted the company for getting a license of soybean varieties, but the firm preferred to form a society where Brazilian partners could participate. Named Brasmax, it was created the year that the Brazilian government authorized the commercialization of GM soybeans of the state of Rio Grande do Sul (2003).

The expansion in Brazil was followed by Bolivia, Paraguay and South Africa. The latter country – by far the dominant GM producer in Africa (Wield et al. 2010) – emerged as an interesting location for the company, with the possibility of becoming a springboard to other countries of the continent. The United States is one of the last destinations: The firm is pointing to the Mississippi Delta area and the eastern states which are not part of the soybean heartland, but contribute 30% of the soybeans produced. The firm portrays this location as the finishing touch for strengthening itself among the big players of the activity: *For us, America is the NBA, the Major League in soybeans. There the legal framework is almost perfect, with over 95% respect for intellectual property, and Monsanto, Pioneer, Dow, Syngenta are there* (*La Nación* 21/8/2012). The goal is to launch, in a joint action with Monsanto, *Xtend* varieties (with tolerance to glyphosate and Dicamba herbicide, *Perfil* 03/02/2014). Finally, the company discusses other potential destinations like Ukraine, Russia and China.

However, Brazil is currently viewed as the country with the highest potential, since it is the second largest producer of soybeans after the United States, and it has vast areas in the Cerrados region where production can be expanded significantly. *The vanguard is Brazil, which easily, and by not touching by any means, the natural resources, can increase the producing area, together with the increased productivity per hectare, which is another factor that works to improve total production* (ACDE, 2012).[21] Another factor that attracts the interest of Argentinian seed companies is the highest recognition of property rights. Due to the climate, farmers located in the north of the country cannot save seeds for the following season.[22]

In 2013, participation in the Brazilian market was estimated by the company to be 24% (55% for the southern states), while in Uruguay it reached 55%, in Paraguay 17%, in Bolivia 8% and in South Africa, 15% (Financial Statements, 2014).

To make possible the expansion into the new territories, the firm begins by evaluating the adaptation of its varieties and licensing them to third parties. Afterwards it tries to establish its own brand. The success of this strategy depends on the degree of participation of TNCs in each country, but also on the type of agrarian structure and degree of development of commercial grain farming.

Research is conducted in all countries where the company has commercial presence. The costs are prorated among all the units owned by the company. Currently, it holds 8 improvement stations, which are located in the provinces of Buenos Aires and Tucumán (Argentina), Passo Fundo (Rio Grande Do Sul) and Londrina (Parana), both in southern Brazil, Rio Verde (Goias), Lucas de Río Verde (Mato Grosso) and Puerto

[21] According to Trigo et al. (2009), the Cerrado region - an area covering approximately 204 million hectares of land (or 24 percent of Brazil's entire land area), with an estimated 40 to 50 percent under productive use – accounts for 59% of Brazil's coffee production, 55% of beef, 54% of soybean, 28% of corn, and 18% of rice.

[22] According to estimates from the president of the company, 38% of the seeds sown in Argentina recognize PBR (considering the sale of certified seeds and royalty payments by the farmer in the case of saved seeds). In Brazil it reaches 60%, in Uruguay, 100% in Bolivia, 65% and in Paraguay, 40% (Source: www.agroempresario.com.ar).

Nacional (Tocatins) in the centre of Brazil, and Dewitt-Arkansas (United States). In 2012, the distribution of localities showed that Argentina led the number, followed by Brazil (see Table 1 below). This is because unlike other neighbouring countries where varieties developed in Argentina are suitable (e.g. those of the Argentinian province of Entre Rios in Uruguay), the Brazilian climate requires greater efforts in terms of research. In 2014, the firm reported trials in 160 localities.

Table 1: Location of the firm research plots

Country	Number of research plots
Argentina	58
Brasil	30
EE.UU	17
Uruguay	11
Bolivia	2
USA	25
Total	143

Source: Don Mario (2012)

Along with its internationalization, the company developed the concept of Yields with no Borders (*Rendimiento sin Fronteras*). Seeds that are the result of a breeding program led on a South American scale have the RSF logo. The company's vision is that political divisions are of secondary importance, only latitude and climate matter, and accordingly, the most suitable varieties for each territory. So *when looking at a South American map, [the members of the company] see the South American region globally. Although there are different cultures, soybean does not face political boundaries, soybean is only one* (Don Mario, 2012: 98). The similarity of this vision with the one introduced in 2005 by the biotech firm Syngenta (referring to MERCOSUR as the United Republic of Soybean), is evident.

Delocalization and relocalization: The territory as a constraint and as a resource

Generally speaking, there are differences between biotech companies and those that develop varieties regarding the location of research. The first conduct their activities in laboratories and tend to concentrate them in important units; the latter conduct trials in different areas to assess the adaptation of varieties to different environments. However, the development of modern biotechnology also allows some delocalization in germplasm companies, as it may be noted in the firm considered by this research. As its expansion to other countries continued, it decided to install its largest laboratory of molecular markers in Londrina (Brazil), with the idea of providing services to the firm's research stations in other countries (*El Tribuno* 12/29/2013).[23] Thus biotechnology enables companies to reduce the incidence of the territorial issue, to increase their scale of operation and to reduce their costs by shortening the time required to develop varieties (the latter also occurs when counter-seasonal activities are developed). The main advantage of this is the large number of samples that can be analyzed daily, at a cost significantly lower than through a large number of field plots (Don Mario 2012)

But in spite of the motto *soybean is only one*, and while biotechnology has the potential to make firms rather independent from territories (thus losing their local ties), other elements continue stressing the importance of the spatial variable. The headquarters of the company in Brazil are located in Londrina, a suitable place, from the commercial standpoint, to visit the multipliers situated in the north and south of the

[23] These facilities are the largest of the company and are already conducting 3,000,000 analyses per year, while in Argentina they can only process about 300,000 samples annually.

country. For the purposes of research, the area is a transition, which enables the production of specific varieties for the two regions (*Clarín Rural* 16/11/2013). It should be added that the EMBRAPA unit that evaluates the adjustments of soybean cultivars to the different climates and soils of the country is also located there.

At a spatial level the logic behind the firm expansion in Brazil follows the expansion of the agricultural frontier led by soybeans, where there was a process of relocalization of production and processing from the southern to the centre-west states.[24] So its first research plots and facilities for seed distribution were located in the south of the country while the most recent ones are in the *Cerrados*.

The company perceives that changes in its *modus operandi* would be necessary, because of the productive structure of these "new" territories, characterized by the presence of larger producers – according to Wilkinson et al. (2013), the average in Mato Grosso farms 3,000 hectares of soybeans – as well as the major traders and input suppliers.[25] In contrast, in the southern states farms are of smaller size and cooperatives play a fundamental role.[26] The seed production area is much more dispersed there and it is easier to produce seeds, as it is a relatively mature industry with significant idle capacity. In the north of Brazil the situation is different: Although there has been an increase in the investments coming from large firms, laboratories and seed processing facilities are less developed. The seed producing area is spatially concentrated due to temperature and humidity requirements: *the north has quite a problem in that it cannot make seeds because of the climate; there are multipliers, but they are all concentrated in an area which has an altitude of 700 meters. It is a plateau; all the big companies are there* (Int Nº 1, 2014). Currently the company moves seeds from the south to the north and that means a significant logistics cost, so it is exploring the feasibility of producing them through co-operators.

In Brazil the firm has established its business model in the way it intends to do in Argentina, based on the outsourcing of production. It should be noted that Brazil has about 38,000 co-operators (Campante 2007), a figure which gives an idea of the widespread possibilities for producing seeds in a decentralized way.

On a more general level, despite the affirmation of the concept of a unique soybean area that overlooks political divisions, the differences between countries are taken into account. From the cultural point of view, the formation of a company in Brazil with two local partners *opened doors and enabled an understanding of the business culture (...) varieties must be registered, so there is a link with the State, Brazil has a complex bureaucracy* (ACDE, 2012: 13). Specifically this partnership allowed the firm to register varieties in two or three years. Afterwards the disagreements with one of the partners on the research focus[27] precipitated changes in the structure of the company, increasing the share of the Argentinian partners. The first commercial campaign was 2007/8 with 1,300,000 bags sold. In 2008 they bought all the capital of the Brazilian firm and one year later they created a new company, Don Mario Sementes, with the aim of capturing the markets of the northern states through large group varieties with a higher added value in the form of treatments (Don Mario 2012). The launch of the first seeds of the new company came along with the release of the new generation of RR seeds Intacta in 2013.

But beyond territory as a limitation, there is the territory as a resource: the differences in results and growth prospects of the Brazilian market could generate a process of relocalization of the firm in the future.

[24] According to Wesz Jr. (2014), the states of Mato Grosso do Sul, Goias, Mato Grosso, Bahia, Amazonas and Piauí, which together held 25% of the processing capacity of the country at the beginning of the 2000s, had risen to 45% in 2009.

[25] With some of these TNCs -LDC and Dow- the firm has developed agreements.

[26] Cooperatives are responsible for buying 2/3 of the soybeans produced in the south of Brazil. Many of them sell inputs in exchange for the soybeans to be harvested, offer purchase contracts to the farmers with fixed prices, and some also process grains in their own facilities (Wesz Jr. 2014a).

[27] In that stage the Brazilian partners wanted to focus research on varieties resistant to the rust disease, an idea that was disliked by the Argentinian partners due to the high investment required and the long period needed for repayment.

Despite its short history in Brazil, it has already registered about 60 varieties there. In 2013, the country accounted for 51% of the group's net income (Financial Statements 2014) and the revenues per bag sold exceeded those of Argentina by 25-30% (*Valor Economico* 14/11/2013). In procedural terms, the view of key informants is that Brazil is pushing the firm's growth, while Argentina is losing relative importance. The latter has an impact on its research departments, leading to strengthen the Brazilian team and seek new alliances: *now we started looking for agreements with the public sector. In Argentina that maturity was reached five years ago, these agreements are already working* (Int Nº 5, 2014).

The so-called business climate also matters in the process of delocalization and relocalization, because local interest rates are lower in Brazil, as well as the country risk, if the firm seeks access to foreign funding. Government agribusiness policies seem to be an important element at play for Brazil: *all the players you meet speak of the importance of agriculture in Brazil, and defend it (*Int Nº 1, 2014). The seed legal framework is quite similar in both countries (see Table 2 below), although the purchase of certified seed is higher in Brazil, a feature that makes the market size different. It means an annual income of USD 1.2 billion compared with USD 240 million in Argentina (*La Nación*, 04/09/2014).

Nevertheless, in relation to Argentina, there is a greater weight of other private actors with which the company competes and negotiates. On the one hand, the importance of TNCs in developing soybean varieties is higher. On the other, and due to the volume traded, *co-operators have much more power in Brazil than in Argentina; that can be seen in the way they negotiate licenses (*Int N º 1, 2014).

Table 2: Prevailing legal framework in Argentina and Brazil

	Plant variety protection					Possibility of patents for plants
	Year of adhesion to UPOV	Farmers' privilege	Breeders' exemption	Essentially derived variety (*)	Protection period	
Argentina	1994 (1978 Act)	Yes	Yes	No	20 years	No
Brazil	1997 (1978 Act and elements of 1991 Act)	Yes (**)	Yes	Yes	15 years temporary crops/ 20 years permanent crops	No

Source: Milanesi et al. 2009

(*) In varieties that retain most of the genetic components of another variety, the original breeder authorization is required for marketing.

(**) Small, family farmers are also allowed to multiply seeds for donations or in-kind exchange with other small farmers. The farmers eligible are those who farm a plot of land as an owner, squatter, renter or sharecropper; employ no more than two hired persons on a permanent basis; do not hold an area greater than four "fiscal modules", as set out by existing legislation; earn at least 80% of their gross annual income from farming, cattle-raising or extractive activities; and live on the farm or in a nearby urban or rural settlement (Wilkinson and Castelli 2000).

Weighing all these factors, the firm does not rule out a possible move of its headquarters to Brazil. In fact it is channelling most of its investments into this country (e.g. the laboratory of molecular markers) and has just over half of its permanent staff there. The number of research plots has increased in Brazil, in comparison with the rest of the countries. In the Argentinian district where its headquarters are located, some key informants refer to this issue stating that *We should see for how long it remains in Argentina, it is developing expansion strategies (...) It is a company with a great potential which tends to be of a foreign kind also (...) to bring in foreign capital (...) Luckily it has a structure of people who gave birth to it and want to*

hold it so far (Int Nº 6, 2014). *The project in Brazil comes from long ago but has been growing in the last four, five seasons. The chain is pulled by sales; [in Brazil] they are increasingly selling. I think that all the things that were happening here, leaving several businesses, and shrinking a little, have to do with it* (Int Nº 4, 2014).

5 Final considerations

The inscription of the firm within the logic of industrial agriculture is clear. The latter is based on large-scale mechanized farming, genetically uniform and high performance crops, and the use of synthetic fertilizers and pesticides. These features are interdependent: the history of the seed industry shows that in major crops, improved varieties favoured those demanding modern production techniques (Wilkinson and Castelli 2000). Hence, this type of agriculture requires a high level of capital and major links of the primary stage with input suppliers and processors. The activity must then be approached as a business devoted to increasing productivity and profitability, rather than as a job or a lifestyle.

Agriculture is a business, an enterprise; one of the most important parts of agriculture is to understand the business (...) In the US some universities have management and agronomy together, the so-called agribusiness schools (Don Mario 2005: 31).

The Gauchos [southern Brazilian farmers] had a long tradition linked to agricultural work and they were those who faster understood the logic of the new agriculture. A move from subsistence agriculture to market production was required, but for doing so it was necessary to do tasks with machinery, to get linked to seed genetic improvement. Besides, they had to tackle the problems with the aid of fertilizers and chemicals that guaranteed crop viability (Don Mario 2012: 93).

The Argentinian company, like others that have expanded their operations in Mercosur countries in the last decade, has contributed to strengthening a production model based on flex-crops and a style of development based on the insertion of these countries as exporters of primary or low processed goods, particularly soybeans. The fact that the latter are transgenic is not neutral. There is growing evidence that the regulatory framework related to agricultural biotechnology tends to establish itself as a global regime (Vara et al. 2012) and constitutes a new form of accumulation (Pechlaner 2010). The characteristics of the Argentinian regulatory framework have influenced both farmers' room for manoeuvre, as well as the local seed industry. The right to save seeds has diminished production costs – an important fact in difficult times – but this could change if the legal framework limits the possibility to certain categories of farmers. Regarding the industry, the breeder exception contemplated by law and the conditions of diffusion of the first GM soybeans in Argentina facilitated the development of national companies, but the situation could change with a more restrictive legislation.

On the other hand, the production scheme associated with soybean production carries on a trend toward productive homogenization. According to Gutierrez and Penna (2004), the characteristics of the crop (i.e. the segmentation of varieties by latitude) imply that no one reaches a widespread diffusion. But it must be kept in mind that the marketing strategy of seed companies – at least in the Argentinian case – is to promote a relatively low spectrum of new varieties each year. The reduced number of varieties may be one of the reasons why some glyphosate resistant weeds have proliferated. Hence, new technological paths to revitalize conventional varieties are gaining greater legitimacy, as the simplification brought by the current model is somewhat leading to a bottleneck. However, these developments would not modify the importance of soybean in regard to the insertion of the Southern Cone countries on a global scale.

Without denying the role of national regulatory frameworks, the study was based on the assumption that agrifood firms are major agents attempting to regulate agrifood conditions (Friedmann 2003). It has shown the important role of national groups coming from the BRICS countries in strengthening a specific production model – not only in their places of origin, but in others belonging to the same economic bloc. A

key feature for their success has been their ability to conform an internal network for seed production and marketing that brings about flexibility and risk diversification. Also the links between some breeders, biotech companies, and state agencies involved in the approval of genetic traits and the control of seed production, grain processors and exporters transform all these actors in key parts of a bigger and extended, although contested, network.

Involving public and private actors in the soybean chain, as well as technical objects (the genetically modified seeds), this network secures a specific technological path and enables the alignment of interests, making the reversibility of the model more difficult (Latour 1994). However, as illustrated in other sections of this paper, there are currently tensions between fractions of capital with different origins, access to resources and position (central or subordinate) in the network that ultimately may modify the situation and lead to new developments.

On the other hand, the production model itself is facing environmental and social objections, which put into question its legitimacy. But this is another story.

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