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Agrarian trajectories in Argentina and Brazil: *multilatin* seed firms and the South American soybean chain

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ABSTRACT

Since the turn of the century, Argentinian seed firms have been internationalizing their operations, focusing on neighbouring countries, specially Brazil. A 'flex crop' such as soybean has constituted a central focus for their investment. This article analyses investment opportunities and different intellectual property rights as key drivers of internationalization, and examines the ability of firms to develop networks that are both 'inward' and 'outward' in their orientation, as well as the tensions involved. The analysis points to the emergence of South-South flows of capital that aim to strengthen their position within key components of agri-food chains, and the formation of transnational elites grounded in global circuits of accumulation.

KEYWORDS

Argentina; Brazil; soybean production; seed industry

Introduction

In recent years, the role of agriculture in modern economies has generated significant interest from academics, governments and members of the public. After several years in which debates on the Agrarian Question were overshadowed by other issues, they are now firmly back on the agenda, because of the abrupt increase in the prices of staple foods in 2007/2008, and increased levels of foreign investment in land and farming enterprises in different countries, among other factors.

These phenomena emerge from tendencies that are profoundly reshaping contemporary agrifood systems – albeit with different nuances in each country and diverse impacts on their agricultural sectors. Common patterns include: the growing integration of agribusiness activities into global value chains; high levels of concentration, particularly in the 'upstream' and 'downstream' components of agricultural value chains; the rapid diffusion of modern biotechnology; and the emergence of new forms of governance that involve the strengthening of private forms of regulation. These developments are often seen as key features of an agrifood regime that has been characterized as 'corporate' in character (McMichael, 2009) – which is not to say that it is devoid of internal tensions and contradictions.

Among recent trends within global agriculture is a growing demand for animal protein within emerging economies, as well as expanded production of biofuels. These mean that countries that are net exporters of these products – and especially of *flex crops*¹ – are strategically well-placed to expand their share of production and trade. In some cases, expansion involves a fundamental shift in development policy, away from previous industrialization and import-substitution strategies,

towards what some authors conceptualize as the *reprimarization* of economies (Bastian & Soihet, 2012), or from a political ecology perspective, as *neo-extractivism* (Gudynas, 2012).²

The expansion of a flex crop such as soybean is often based on a distinctive configuration of elements: natural resources such as land, a specific technological package comprised of transgenic seeds, no-till methods and an herbicide (glyphosate), as well as a restructuring of units of production. Organizational innovations, such as the emergence of *multilatin* firms in the initial states of agri-food chains, are of particular interest, since they put into question older notions that capital investments always flow from North to South.³

Taking this general framework as a starting point, this article seeks to illuminate how the emergence of internationalized firms in countries such as Argentina and Brazil is linked to their location within a changing global division of labour. It considers the factors that have enabled Argentine seed firms to expand into key components of the Brazilian soybean value chain, accompanying – and fostering – the increased importance of this crop within the economies of both countries.

Seed companies are rarely considered when it comes to relationships amongst countries in the Southern Cone, despite the fact that plant breeding influences both the diversity of food available within the agri-food system as a whole and the environmental impacts of different crops (Bonny, 2014). The seed industry also plays a fundamental role in shaping farming practices, through the control of nature, homogenization and standardization that it involves (Hubert, Goulet, Tallon, & Huguenin, 2013). In strictly economic terms, the seed industry represents a highly dynamic sector both in Brazil and Argentina, which respectively represent the fourth and ninth largest markets for seed worldwide (Argentinian Seed Association, 2013).

The aim here is to analyse the development of *multilatin* firms in the seed production component of the soybean chain, paying attention to the rationale behind their expansion in recent years, the business models that they have adopted, and their relationships with other actors in the seed industry. Regarding the latter, the study shows that while *multilatin* firms are subordinate to biotech companies, this is not necessarily the case when considering their internal networks. This is a relatively unexplored topic, since the dominant position of large multinational corporations in the seed industry, especially in the development of transgenic traits has led to neglect the role of breeding companies, especially those originating in developing countries. Research combined in-depth personal interviews carried out in 2014 with key informants, including public sector officials, company representatives and technicians, analysis of articles published in Argentinian newspapers and magazines during 2005–2014, and collection and analysis of relevant documents and available statistical data.

The article is organized in the following sections. The second section analyses the place of the MERCOSUR⁴ grouping of countries within global patterns of soybean production, and the factors that account for the growing importance of this crop. The third section of the article provides some historical background on the internationalization of Argentinian firms⁵, and the fourth sets out an analysis of dynamic local actors in the seed sector. Finally, some concluding remarks are presented.

Brazil and Argentina as cornerstones of the MERCOSUR soybean sector

The MERCOSUR grouping of countries is prominent in global rankings of food exporting countries, particularly in relation to soybean and animal protein. In the 1980–2010 period, the rate of increase of food production in the bloc was double that of the rate experienced at a global level (Reca, 2012). This dominant position has been maintained in recent years, and has even strengthened in relation to some products. With nearly 139 million metric tons produced in 2012/2013, the MERCOSUR

bloc is now the main producer of soybean worldwide, accounting for 52% of total global production (United States Department of Agriculture, 2014).

Over the past four decades the South American region recorded the fastest growth in soybean of any region in the world. The cultivated area increased by a magnitude of 20 times between 1991 and 2010 (see Table 1). The process has involved a fundamental reorganization of territory in South America from the point of view of production. The expansion of soybean has involved the expansion of the total area of land under agricultural production, the replacement or displacement of other agricultural products, and the cultivation of land formerly under natural forests. Expansion has also had major impacts on the agrarian structure of many countries, since soybean is produced mainly by large-scale and medium-scale farmers: although about 73,000 farmers in Argentina planted this crop in 2008 (around a quarter of the total number of producers), only 6%, with farms over 500 hectares, produced nearly 50% of the total yield (ONCAA 2008, cited in Regunaga, 2009). In Brazil, the concentration of soybean production in large landholdings is even higher. Only 4% of all farms (217,000) produced soybean in 2006, yet those with farms over 500 hectares representing 5% of total farm units, accounted for 2/3 of soybean production (Wesz, 2014a).

Changes in the world soybean market are important for explaining the expansion of soybean production in the MERCOSUR countries. In the 1960s and 70s there was a temporary moratorium on US soybean exports⁶, together with a global shortage of Peruvian anchovies, the main source of fish-meal used by the animal feed industry at that time. From 2000 onwards, the increased demand from

Table 1. Changes in the total area of arable land and in the area planted with soybean in MERCOSUR countries, 1991–2009.

| Country | Year | Arable land (in million hectares) | Soybean-planted area (in million hectares) | Per cent of arable land with soybean |
|-----------|------|--------------------------------------|---|---|
| Argentina | 1991 | 26.4 | 5 | 18.94 |
| | 1995 | 27 | 6 | 22.22 |
| | 2000 | 27.9 | 10.66 | 38.21 |
| | 2005 | 29.5 | 15.39 | 52.17 |
| | 2009 | 31 | 18.34 | 59.16 |
| Bolivia | 1991 | 2.11 | 0.19 | 9.00 |
| | 1995 | 2.5 | 0.43 | 17.20 |
| | 2000 | 3 | 0.62 | 20.67 |
| | 2005 | 3.81 | 0.93 | 24.41 |
| | 2009 | 3.74 | 0.9 | 24.06 |
| Brazil | 1991 | 52 | 9.62 | 18.50 |
| | 1995 | 58.06 | 11.68 | 20.12 |
| | 2000 | 57.7 | 13.64 | 23.64 |
| | 2005 | 61 | 22.95 | 37.62 |
| | 2009 | 61.2 | 21.75 | 35.54 |
| Paraguay | 1991 | 2.15 | 0.55 | 25.58 |
| | 1995 | 2.6 | 0.74 | 28.46 |
| | 2000 | 3.02 | 1.2 | 39.74 |
| | 2005 | 3.46 | 2 | 57.80 |
| | 2009 | 3.8 | 2.52 | 66.32 |
| Uruguay | 1991 | 1.26 | 0.02 | 1.59 |
| | 1995 | 1.29 | 0.01 | 0.78 |
| | 2000 | 1.37 | 0.01 | 0.73 |
| | 2005 | 1.3 | 0.28 | 21.54 |
| | 2009 | 1.88 | 0.58 | 30.85 |
| MERCOSUR | 1991 | 83.92 | 15.38 | 18.33 |
| | 1995 | 91.45 | 18.85 | 20.61 |
| | 2000 | 92.99 | 26.13 | 28.10 |
| | 2005 | 99.07 | 41.54 | 41.93 |
| | 2009 | 101.62 | 44.09 | 43.39 |

Source: Catacora Vargas et al. (2012)

emerging countries for animal feeds and the expansion of biofuels were the key determinants of increased production of soybean (Costantino & Cantamutto, 2010).

While Brazil and Argentina together hold 91% of MERCOSUR's soybean acreage, there are significant differences in the character of the soybean value chain in each country, and differential degrees of specialization that affect their respective vulnerability to external shocks. In Brazil, the 1996 Kandir Law eliminated a tax on exports of raw materials and kept the tax burden on industrialized products (Wesz, 2014b). Consequently, in 2010 65% of soybeans were exported, 65% of them non-processed (ABIOVE, 2015). While Argentina has re-established export taxes on grains since 2002, the tax regime benefits value-added products and encourages local processing. In 2010 77% of soybeans were exported, 57% as flour and 12% as oil (CIARA, 2010). National companies have a greater weight in Argentina than in Brazil, controlling over 30% of exports of flour and soybean oil (Wesz, 2014b).

In Argentina the soybean complex provided 30% of all exports in 2015, while it accounted for only 15% of exports in Brazil. However, the contribution of soybean to total exports has been increasing in both countries (see Figure 1). The sector strengthened its importance in Argentina as it supplied foreign currency in a context where access to international credit was restricted after the country's debt default of 2002 (Craviotti, 2015). Fees from major agricultural exports are also important for the state budget.⁷

From the geographical point of view, soybean cultivation began in Argentina in the most fertile areas of the Pampean region. Although production of the crop has expanded to the northwest and northeast of the country, the Pampas still represent 85% of the total soybean acreage (SIIA, 2011). In Brazil soybean developed first in the south (in the states of Rio Grande do Sul and Paraná), and expanded later in the centre-west and centre-north of the country, in the *Cerrados* zone and parts of the Amazon region. These areas thus displaced production in the 'traditional' southern regions, which account for only 37% of the cultivated area today (APROSOJA, 2011). A few decades ago, the *Cerrados* were not suitable for grain production, but the involvement of different government agencies was critical for the opening up of this zone for agribusiness investment (Gras, 2013). Thus, the state-owned company EMBRAPA (*Empresa Brasileira de Pesquisa Agropecuaria*)

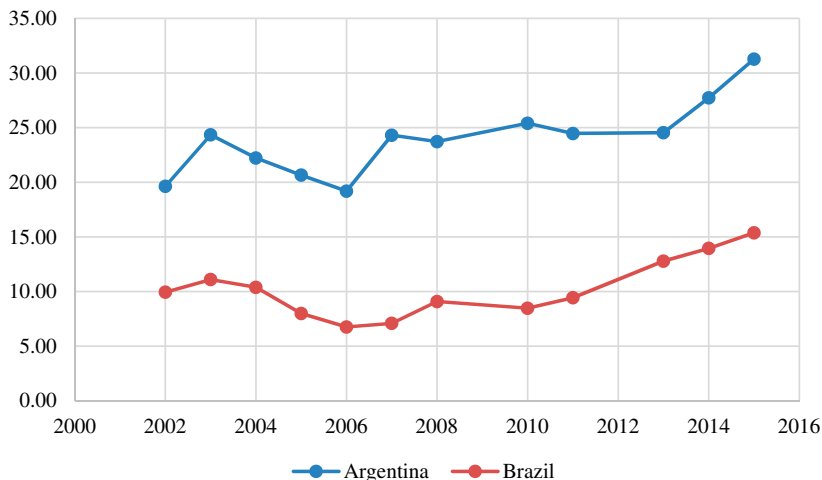


Figure 1. The contribution of soybean to exports in Argentina and Brazil (as a % of total exports). Source: The author, based on data from INDEC (2002–2015) and ABIOVE.

developed fertilizers that allowed soil acidity in the savannah to be reduced, and also soybean varieties adapted to this region. Government also invested in roads and irrigation infrastructure, as well as offering low-interest loans to producers. Some of the states of the *Cerrados* also have tax incentive programmes designed to attract agricultural producers and business ventures (Campos Mesquita & Lemos Alves, 2013).

In the case of Argentina, public support of this magnitude for the development of soybean did not exist, but the emergence of a technological package, based on the combination of transgenic varieties resistant to glyphosate and no-tillage, was crucial. A set of public policies enabled Argentine producers to access this key package. On the one hand, the official approval of glyphosate-resistant soybeans occurred 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 then considered higher than in the United States, the first country to introduce this technology (Trigo & Cap, 2003). Today, GM soybeans cover 20.3 million hectares in Argentina (ARGENBIO, 2016), nearly 100% of an estimated area of 20.6 million hectares under the crop.

The widespread adoption of GM soybean was also 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 rapid dissemination of this technology. The first application to the National Advisor Commission for Agricultural Biotechnology (Comisión Nacional Asesora de Biotecnología Agropecuaria, CONABIA), a public body composed of representatives of the state, industry and the scientific community, to conduct field trials of GM soybean varieties was presented by the company Nidera in 1991. Later, Monsanto could not patent the gene that confers tolerance to glyphosate because the technology had already been 'freed'.⁸ This, together with the possibility of using farm-saved seeds (a right recognized by the Argentine legislation in coherence with its participation in UPOV 1978) allowed the rapid diffusion of the new technology. Besides, the lower operating costs that the new package initially enabled was a key motivation for its adoption, given that economic policies implemented in a context of declining international grain prices pushed local farmers towards cost-saving strategies (Craviotti, 2002).

The widespread adoption of GM soybean contributed to the massive expansion of the area under the crop. In contrast, Brazil did not allow GM seeds until 2003, a factor that explains its later expansion when compared to Argentina. Nevertheless, producers from the southern states of Brazil 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 2003/2004 and 2004/2005 through a series of provisional measures (Brieva, 2006). Ten years later, it is estimated that GM soy occupies 93% of the area in Brazil planted to this crop (Celeres, 2014).

In Argentina, after an impasse in the 1999–2003 period, 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). Biotech approvals between Argentina and Brazil are now being harmonized; for instance, the two countries have entered into joint negotiations with the Chinese government for the approval of new soybean seeds that embody 'stacked' GM traits (insect resistance and glyphosate tolerance). This strengthens a trajectory of agrarian development, in which flex crops represent an important basis for re-negotiating the role of both countries in the international division of labour.

Argentinian *multilatin* firms in the soybean sector

In addition to public policy, another important factor underlying the massive expansion of GM soybean in the MERCOSUR region has been the emergence of *multilatin* companies whose accumulation strategies are strongly founded on this profitable crop. Their growth is obviously linked to globalization, which involves financial and trade flows across national boundaries, as well as the strengthening of global value chains (Schorr & Wainer, 2014). Although today Argentina diverges from other Latin American economies in relation to the magnitude of outward flows of investment – they range from 700 to 2000 million dollars in the 2007–2015 period, while in Chile and Mexico they have peaked 22,000 million in some years – the country is undoubtedly part of this trend (Figure 2).

Different phases can be identified in the internationalization of Argentinian firms. In the early twentieth century, and in line with the country's role at the time as a leading producer of wheat, corn and beef worldwide, a limited number of local companies were the first firms not based in developed countries that established overseas facilities. This trend continued during the import substitution stage of the 1940–1970 period, the ventures concerned being of relative low levels of investment, but gained new momentum in the 1990s, a period marked by the implementation of neoliberal policies in Latin America. Increases of scale of production and degree of internationalization were required in a context of increasing competition (Kosakoff & Ramos, 2010). Also, the regional integration process that began in 1986 between Brazil and Argentina, and which extended to other countries in South America through the creation of MERCOSUR in 1991, removed barriers to trade and facilitated this process (Belik & Rocha Dos Santos, 2002). Some Argentinian firms expanded their operations to other countries in this stage. It should be noted, however, that leading local firms were also bought by foreign capital, increasing levels of foreign ownership (Kosakoff & Ramos, 2010; Schorr & Wainer, 2014).

With the marked devaluation of the Argentinian currency in 2002, a new phase of internationalization began. Some Argentinian firms started operations in other MERCOSUR countries focused on the soybean value chain, propelled by the growth of global demand for the product, especially from China.

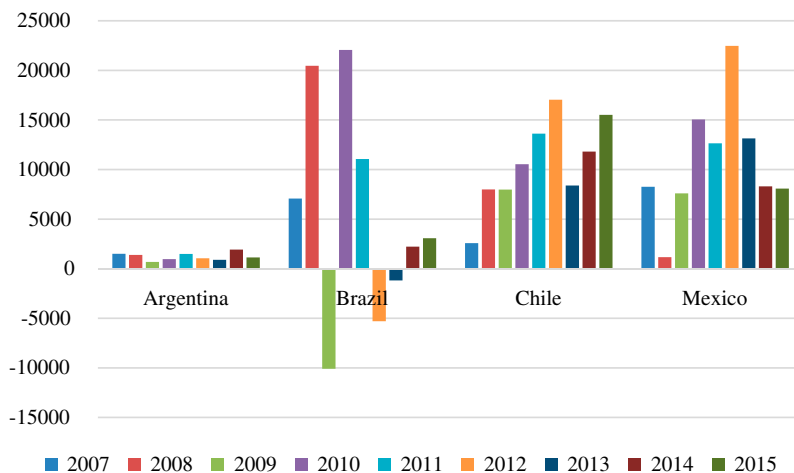


Figure 2. Outward flows of foreign direct investment in selected Latin American countries. Source: The author, based on data from United Nations Conference on Trade and Development (2005, 2010, 2016).

Over the long run, however, the trend is declining levels of outward investment by Argentinian firms in general, when compared with those from other major economies in Latin America (ECLAC, 2006; Finchelstein, 2012). This fact highlights the diverging trajectory of those Argentine firms that have internationalized their operations in recent years through investments in different parts of the soybean chain.

'Sowing pools' and seed firms stand out in the map of actors that have pursued this strategy. The firms that form sowing pools do not necessarily own the land that they operate but, rather, lease it on a short-term basis under various contractual arrangements while outsourcing farm tasks through contracting. The biggest pools also have fluid connections with financial markets. Sowing pools have developed mainly in grain agriculture, and have soybean as a main component of their strategy. Regional expansion allows them to spread climatic and political risks, to diminish operating costs, and to gain access to key resources such as cheap land (Bisang & Anllo, 2014; Gras & Sosa Varrotti, 2013; Manciana, Trucco, & Piñeiro, 2009). Some leading sowing pools have also established partnerships with foreign capital to facilitate large-scale investment (Murmis & Murmis, 2012).

In the case of seed firms, there are technical aspects that favour the move to international operations: germplasm can be transferred between different areas and countries, and testing in different natural environments, rather than a narrow range of ecosystems, enables identification of the most suitable materials for development (Jacobs & Gutierrez, 1985).

At a global level, the internationalization of the seed industry began in the 1970s and led to a global restructuring. The number of mergers and acquisitions increased greatly in the 1990s, when hybrid seed companies were integrated into the agro-chemicals industry. Concentration in the global seed market saw the four leading firms increasing their share from 21% in 1994 to 54% in 2009 (Fuglie et al., 2011).

Soybean varieties are self-pollinating, however, and this opened space for the development of local actors in the seed industry. In Argentina, systematic research on this crop was initiated about five decades ago, with state agencies and national firms testing the adaptation of materials originating mainly from the United States (Jacobs & Gutierrez, 1985). As years passed, plant breeding by local operations began to take off, public sector organizations (such as the National Institute for Agricultural Technology, INTA) lost ground, as local companies began to develop their capacity to undertake germplasm crossings. At this stage transnational corporations (TNCs) did not display much interest in soybean (Brieva, 2006). Since they are self-pollinating, harvested soybean seed can be used by farmers without any change in their qualities. This condition not only extends the farmers' room for manoeuvre but also limits the ability of the private sector to increase the price of seeds. Thus, foreign companies focused on hybrid seed (for crops such as maize, sunflower and sorghum) where there is a 'natural' barrier against multiplication and farmers are forced to buy seeds every planting season.⁹

Today, the Argentinian soybean seed market is supplied almost entirely with genetic material of local origin (Figure 3), and national firms – such as *Don Mario*, *Santa Rosa*, and *Agseed* – are important suppliers within this market (Figure 4). However, in a context dominated by GM soybean, these local breeders establish agreements with biotech firms (which are mostly TNCs) to add transgenic traits to their varieties. As a result, they remain rather invisible in studies of the seed industry, since their varieties tend to be 'subsumed' within the accounts of large biotech companies.

The evolution of the Argentine register of cultivars over the last 15 years shows a marked mobility of companies in the soybean sector, although some of them hold a more stable position. Among the

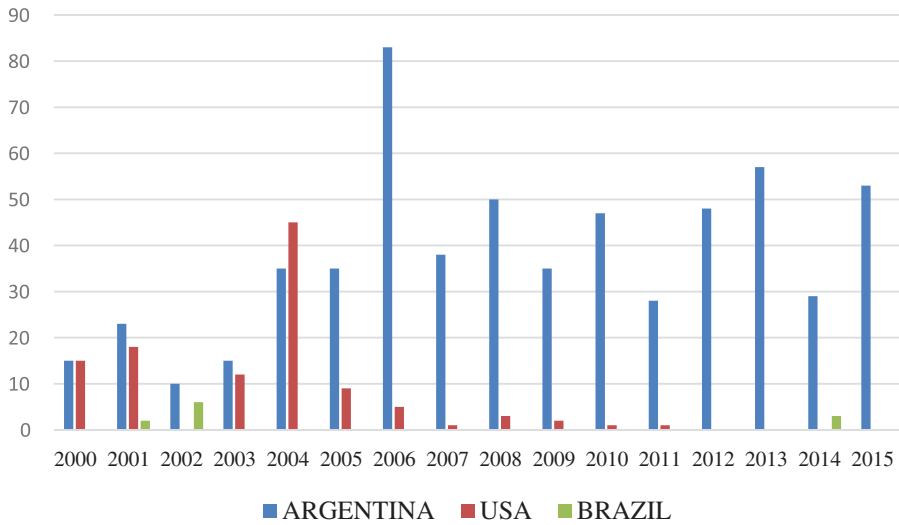


Figure 3. Argentina. Origin of soybean varieties. Source: The author, based in the National Register of the Property of Cultivars.

latter, *Don Mario* holds a leading role together with *Nidera*, a company of Dutch origin that has been recently bought by the Chinese state-owned firm COFCO. These two firms control 90% of the market, and produce the entire range of the varieties grown in the country.

A handful of these seed companies – *Nidera*, *Don Mario*, *Santa Rosa*, *Agseed* (the later three of local origin)- have also started to deploy an internationalization strategy in the last decade, with soybean varieties as flagship products, and Brazil as a key destination. According to a key informant from the public sector (author interview, 2014), their early expansion was related to the fact that:

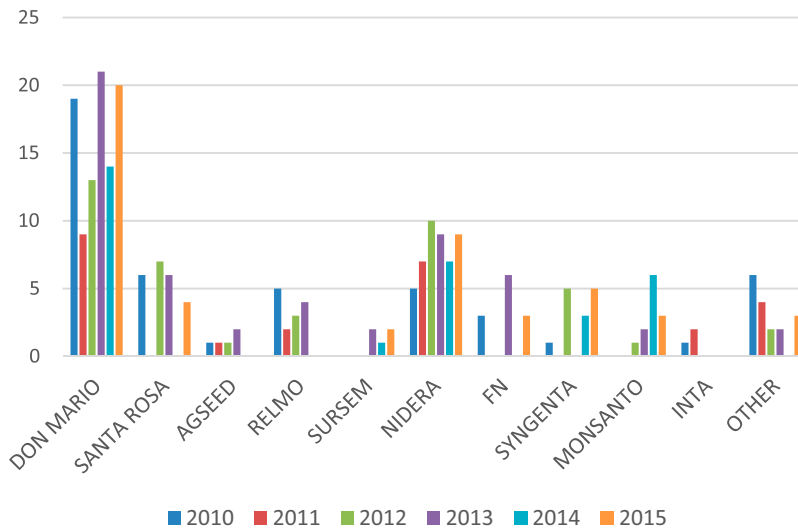


Figure 4. Argentina. Registered soybean varieties by firms and institutions. Source: The author, based in the National Register of the Property of Cultivars.

Argentina pioneered genetic development [...] the other issue is that Brazil at that time did not admit transgenic seeds, and the transgenic materials that these companies could provide had much know-how and things to offer with a different germplasm base.

These firms view Brazil as the country with the highest potential for investment, since it is the second largest producer of soybean after the United States, and contains vast areas in the Cerrados biome where production can be significantly expanded.¹⁰ In addition, according to key informants, farmers of this region do not engage in the practice of saving their seeds.

Another factor that attracts the interest of seed companies in Brazil is its stronger recognition of intellectual property rights, when compared with Argentina. Although the seed laws in the two countries are similar in some respects, they differ in others – notably in relation to those that allow seed firms to capture value (Table 2). Both countries do not allow patents for plants, and they recognize the rights of rural producers to save seeds, and of breeders to use existing protected varieties to develop new ones. However, in the case of Brazil, if a new variety is distinguishable but derived predominantly from an original, protected variety, the authorization of the owner of the original cultivar is required for purposes of marketing. The right of farmers to save seeds is also limited to the second generation of seeds purchased in the formal market.

In Brazil, on the other hand, seed firms have succeeded in co-opting some producers' organizations and have secured private contracts to collect royalties (Filomeno, 2013; Scoones, 2008), a practice that has been resisted in Argentina. All these factors facilitate successful accumulation strategies by seed firms in Brazil.¹¹ The purchase of certified seed is higher, bringing in an estimated annual income of US\$1.2 billion, in contrast with US\$240 million in Argentina (*La Nación*, 4 September 2014). Government agribusiness policies seem to be an important element at play for Brazil, as one key informant said, 'all the players you meet speak of the importance of agriculture in Brazil, and defend it' (author's interview, 2014). The so-called 'business climate' also matters – local interest rates are lower in Brazil than Argentina, affecting the cost of external financing for firms expanding their investments.

Taking into account this general background, the evolution and mode of operation of a leading Argentinian seed firm will be analysed in the next section. Some comparative material on other seed firms is also discussed. With only a small number of firms dominating the market, the strategies of these firms, within the prevailing regulatory framework, play a key role in shaping the dynamics of the soybean seed market (Fuck & Bonacelli, 2007).

Table 2. Prevailing legal framework in Argentina and Brazil.

| | Year of adhesion to UPOV | Plant variety protection | | | Protection period | Possibility of patenting plants |
|-----------|--|--------------------------|---------------------|--|-------------------|---------------------------------|
| | | Farmers' privilege | Breeders' exemption | Essentially derived variety ^a | | |
| Argentina | 1994 (1978 Act) | Yes | Yes | No | 20 years | No |
| Brazil | 1997 (1978 Act and elements of 1991 Act) | Yes ^b | Yes | Yes | 15/18 | No |

Source: The author, based on Salles-Filho et al. (2011) and Wilkinson and Castelli (2000).

^aIn varieties that retain most of the genetic components of another variety, the original breeder's authorization is required for marketing of the variety.

^bSmall, family farmers are 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.

An internationalized seed company of Argentinean origin

As argued above, the soybean seed sector in Argentina is heterogeneous, with a spectrum of producers that includes global companies, firms of national capital, and producers' cooperatives that began their activities in a rather modest way. One of the two leading firms in the country is owned by local partners, and was created in 1982 by a group of friends who together invested a small sum of money (US\$15,000) in grain production on rented land. In the beginning, they rented plots in an in-kind basis, an arrangement that allows the farmer and the landowner to share risks.¹² Meanwhile, they performed testing of soybean varieties for a local, non-profit technical organization. This allowed them to see the advantages of the short-cycle varieties in which the company would later specialize.¹³

Three years after the firm initiated the production of seeds, using an American short group variety, then of public origin. Taking these varieties as its starting point, it developed a niche previously unoccupied by other seed companies. Short cycle varieties expanded in the Pampean region because of their advantages: they bloom before longer cycle varieties, they are resistant to the development of certain diseases (Sclerotinia), and their yields are higher. However, as the critical period of crop development falls earlier than other varieties, the risk of crop failure is increased in drought periods. However, no-tillage techniques also began to be developed around this time in Argentina, and these, by helping to preserve soil moisture, have mitigated the impact of drought.

After 1989 the company was able to import machinery and various seed varieties into Argentina. This followed the coming to power of the neoliberal government of President Carlos Menem, with its policy of strongly encouraging foreign investment, coupled with the establishment of 'one to one' parity up between the Argentine peso and the US dollar. The firm continued to test imported seed varieties and strengthened its presence in the local market, thanks to its policy of forming alliances with TNCs. Thus, a global grain trader bought seeds from the company and sold them to farmers, also offering financial assistance to the farmers interested in buying these seeds. This partnership lasted from 1992 to 1995, and was replaced in 1996 by an agreement with Monsanto, which allowed the company to market its seeds through Monsanto's distribution networks, and to employ the GM seeds (resistant to glyphosate) to develop its own varieties through germplasm crossings. These seeds started to be known as 'RR' because of the commercial name (Round-up Ready) of the herbicide.

The agreement with Monsanto also brought indirect competitive advantages to the seed firm. In 1998 it bought another local company whose value in the market had diminished because it could not establish an arrangement with Monsanto regarding access to the transgenic trait. This acquisition allowed the firm to expand its portfolio of varieties (until then limited to the Pampean region), and to achieve national coverage, following expansion of the area planted to soybean. At this stage, the firm changed its status from that of a limited liability company to a corporation (Don Mario, 2005).

The devaluation of Argentina's currency in 2002 radically altered the context and greatly increased the cost of royalties to be paid to owners of patents. In addition, Monsanto adopted a much tougher stance in relation to the Argentinian regulatory framework for seed production, resulting in increased pressure on other seed companies. In 2004 Monsanto announced its withdrawal from the soybean industry in Argentina, in retaliation for the country's denial of its application for a patent on the glyphosate-resistance technology, and filed lawsuits in countries importing soybean products from Argentina (Filomeno, 2013). The national firm decided to strengthen its in-house breeding programme and to create its own sales network, since its agreement with Monsanto had ended. In fact, it can be argued that the withdrawal of the biotech company from Argentina, together with the boom of soybean production, in fact promoted the national firm's growth.

At this stage, the company affirmed its vision of becoming an industry leader in soybean genetics. In the 1996–2000 period, it had registered only four soybean varieties in the country, but over the next five years the figure rose to 24 (*Infobae*, 27 October 2006). The firm has registered about 50 varieties since 2000. However, upgrading of its capacity to develop specific traits is not part of its plans for the near future. It is estimated that in the case of soybean, the development of a transgenic trait requires about 16 years and a 136-million-dollar investment (Rocha & Villalobos, 2013).

In the period since 2000 the company has not only increased its turnover but also bought up other firms in the seed sector. It has developed a holding structure which at present includes 10 related firms in Argentina and a similar number in neighbouring countries, as well as in the United States, and South Africa. It has created companies specifically to make finance available to its suppliers, and placed securities on financial markets in order to raise capital at low interest rates. The possibility of registering the company on the stock exchange is under consideration by firm partners. These developments can be explained by the increasingly large amount of capital required for producing and processing seeds in Argentina, as well as for the investments required to expand into Brazil.

The *modus operandi* of the firm illustrates its character as a *network within networks* (Dicken & Malmberg, 2001). It has developed an external network of alliances with firms which are leaders in the provision of agri-food inputs worldwide. It has established agreements with biotech companies for the use of transgenic seed traits, and with other companies for co-investment in new enterprises, such as a joint venture with Louis Dreyfus for the production and sale of corn seed, and another with Dow for operation of a hybrid corn processing plant, both in Brazil. The Argentine company and Dow also have a partnership in Bolivia, for the production and marketing of soybean varieties.

The firm's initial alliance with Monsanto has given way over time to a more diversified network of partners, which includes other TNCs. Currently, the attractiveness of partners seems influenced by two considerations: firstly, the firm's need to strengthen its position in Brazil; secondly – and as explained below – tensions regarding the capture of the benefits associated with the 'new' generation of transgenic seeds.

Just as the emergence of glyphosate tolerant soybeans 10 years ago radically altered the map of key actors in the seed industry, similar processes have recently arisen with the advent of 'stacked' GM traits in soybean seeds. In this case, Monsanto has aimed to ensure the collection of royalties from the very beginning, and has entered into agreements with local breeders, grain processors and exporters to test for the presence of these traits in soybeans delivered by farmers. The biotech company has also tried to have the value of farmers' royalties vary in accordance with the productivity increases obtained.

All of these strategies of Monsanto's were questioned by farmers' organizations in Argentina, resulting in lower than anticipated sales of soybean seeds with stacked GM traits. In turn, this has caused problems for the Argentinian firm, which had bet heavily on these varieties. Also, and from the breeders' perspective, the technology fees established by Monsanto tend to overvalue genetically engineered traits at the expense of the contribution of germplasm to the increase of productivity, and this has generated tensions between partners. These arise from the asymmetries in access to resources and position in the global seed industry that exist between breeders of national origin and biotech TNCs.

So, in the last years the Argentinian company seeks to maintain a degree of technological independence through strengthening its in-house research programme for breeding non-GM soybeans. Other local firms engage in similar strategies. This increases their flexibility, as it enables the companies to add to its own seeds transgenic events developed by other biotech firms, and enables to develop new niche markets for non-transgenic soybean varieties. As stated by a firm representative:

We have conventional varieties that were in existence before the [GM]traits [...] it is a very strong programme [of breeding] because 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. (Author's interview, 2014)

It should be added that the leading Argentinian firm has also created a subsidiary for producing non-GM soybean for export, either directly itself or through contracts with outgrowers. Although the overall volume managed is relatively small, it has been growing over time, so this firm has become the main exporter of non-GM soybean from Argentina (*Infocampo*, 17–23 October 2014).

However, the subordinate position of local breeders in relation to biotech corporations is not necessarily replicated in their relationships with local actors. The leading Argentine firm outsources an important part of its seed production to diminish operating and financial costs, and to disperse risks amongst many actors. Outsourcing is achieved through a variety of mechanisms, including agreements with *co-operators*, who buy basic seeds, and then multiply, classify and sell them, paying royalties to the company; and agreements with *multipliers* (farmers), to whom the firm sells basic seeds and then buys from them multiplied seeds at harvest. For activities related to the 'industrial' phase of seed production, the company has its own seed classification plants. The company also hires out processing services to a range of third parties.

Another key strategy employed by Argentinian soybean seed firms over the last decade has been to expand abroad. This began with the commodities 'boom' of the 2000s, and was initially deployed in Argentina's neighbouring countries. It also encompassed South Africa – by far the dominant GM seed producer in Africa (Wield, Chataway, & Bolo, 2010) – considered as a possible 'springboard' to other countries of the continent. The United States is one of the most recent destinations, while other countries such as Ukraine, Russia and China are also being considered (*Perfil*, 3 February 2014). However, Brazil is viewed by these *multilatin* seed firms as the market with the greatest potential, as outlined above. On the other hand, the progress made by seed firms of Argentinian origin in the development of varieties and especially of short-cycle soybeans was probably a competitive advantage, as indicated by a key informant of the public sector. The manager of a seed company in southern Brazil confirms this perspective, stating that *Argentine cultivars had already advanced in research with RR, and occupied space quickly. Brazil used materials with a later maturity cycle, with many leaves and a certain growth habit. These materials ended up suffering diseases, while the Argentine cultivars, with less leaves, more efficient and with a shorter cycle [of maturity] had a great advantage over the Brazilian cultivars* (*La Nación*, 9 September 2014). These indeterminate short varieties are particularly suitable for an annual double-cropping scheme.

To begin operations in these new territories, seed firms usually establish agreements or partnerships with local entrepreneurs who facilitate access to key resources (knowledge of locations suitable for testing varieties, links to seed growers, etc.). In Brazil, the leading Argentinian firm chose to develop its activities through a partnership with local seed firms, which was created in the same year that the Brazilian government authorized the commercialization of GM soybeans in the state of Rio Grande do Sul (2003). As a company representative explained:

They helped us to understand the Brazilian farmer, the business culture of Brazil. In this business, seed varieties must be registered, so there is a link with the state, and Brazil has a complex bureaucracy. (ACDE, 2012, p. 13)

Specifically, this partnership allowed the firm to register many varieties in just a few years; it has already registered about 60 in Brazil. Yet disagreements on the research focus precipitated changes

in the company, increasing the share of the Argentinian partners. In 2008, they bought up all of the firm's stock, and one year later they created a completely new company in Brazil.

Despite its short history in Brazil, over half of the firm's staff and its largest laboratories are located there.¹⁴ In 2013 the Brazilian market accounted for 51% of the group's net income (Financial Statements, 2014). The firm estimated that it held 24% of the Brazilian soybean market, with a 55% share of the market in the southern states of Brazil (Financial Statements, 2014).

As is the case with other Argentinian seed companies that have expanded their operations abroad, the leading firm also undertakes local research. In 2014, it reported that it had undertaken research trials in 160 localities across all America, Africa, Asia and Europe. Argentina itself was the location for the largest number of trials, followed by Brazil. The research department of the firm works as a single multinational team, gathering information from all locations (author's interview, 2014).

Along with internationalization, the company developed the concept of 'Yields with no Borders'. This is based on the notion that political divisions are of secondary importance to the company, only latitude and climate matter, and accordingly, the focus is on the most suitable varieties for each territory.

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, 2013, p. 98)

The similarity of this vision to the one introduced in 2005 by Syngenta, which refers to MERCOSUR as the 'United Republic of Soybean', is clear.

Conclusion

This article has focused on the development of *multilatin* firms in the soybean seed sector of countries in the MERCOSUR bloc, with a focus on Argentinian companies. Viewed from a long-term perspective, a key feature of the Argentinian firms that have expanded into other countries has been their interest on the production of commodities, or in activities directly linked to such production. Yet their present involvement in key stages of the South American soybean chain as a whole is a relatively new phenomenon, which cannot be dissociated from the role played by the country in the global trade, which has a strong focus on 'flex crops', particularly transgenic soybean.

Seed firms do not necessarily engage in land grabbing and control. On the contrary, their strategies demonstrate the importance of intangible assets such as brands and intellectual property rights (Pritchard, 2000) in attempts to amplify their influence on other actors and thus strengthen processes of accumulation. These features pose challenges to contemporary studies of agrarian change, which tend to emphasize control of tangible assets.

The strategies adopted by these firms also show the existence of South-South flows of capital, that may indicate the incipient formation of transnational elites grounded in global circuits of accumulation (Robinson, 2015). These developments are not yet stabilized: the procurement of Nidera by COFCO and of Syngenta by ChinaChem imply the emergence of new flows of capital from BRICS countries, that aim to strengthen their position within key components of agri-food chains.

Until now *multilatin* firms have adopted a regional rather than global strategy, and have taken advantage of processes of market integration facilitated by trade agreements. In the case of Argentinian seed firms, they have also considered countries that do not belong to MERCOSUR as possible sites of expansion. In terms of the paradigm posited by Dunning (2000), the foreign activities of these firms have been driven by a specific set of advantages: their dominant position in the breeding of

transgenic soybean varieties, facilitated by early approval of the glyphosate-resistant event, and underpinned by the specific conditions enabling its diffusion in Argentina. However, locational advantages, and particularly the differences between countries in relation to regulatory frameworks, have also been key, enabling value capture and accumulation. Other aspects, such as the growth potential of the 'new' soybean areas (such as the Brazilian Cerrado) have also been important factors.

In the case of the leading Argentinian seed firm, organizational innovations have played a key role in the firm's development and its internationalization. These are evident in its ability to build an effective internal network for the production and marketing of seeds which, through outsourcing, also enables flexibility and risk avoidance. Connections to global corporations, on the other hand, have enabled access to key resources and investment opportunities, while relationships with selected local actors have facilitated the firm's growing role in new settings.

From another point of view, this multifaceted network that involves public and private actors in the soybean chain, as well as technical objects (GM seeds), enables an alignment of interests and secures a specific technological path (Latour, 1994), that constrains its reversibility. However, as illustrated above, there are currently tensions between different fractions of capital of different origin, control of access to resources and position within the network, a situation that could ultimately bring about unexpected results. The move by national breeders to resume crossings of non-transgenic soybean varieties, although motivated primarily by the opportunities opened up by the multiple licence agreements that govern biotechnology, could indirectly help to broaden the scope of possible choices. Yet, the latter seem to be confined to soybean, ruling out a general move towards diversification.

Notes

1. Flex crops are agricultural products that can be used as food, feed and biofuels, and which can be changed flexibly according to circumstances (Borras, Franco, Kay, & Spoor, 2011). In the MERCOSUR countries maize, sugarcane and soybean are good examples.
2. Following Bastian and Soihet (2012) *reprimarization* can be defined as an increase of the share in exports of primary and manufactured products with low value added and/or low technological content. *Neo-extractivism* is a model of development based on the appropriation of nature, which sustains a barely diversified productive structure and involves the insertion of a country into the world economy mainly as a provider of raw materials.
3. A *multilatin* or *global latina* firm has been defined as a company with its origin in a Latin-American country that has value-added operations outside its country of origin (Cuervo Cazorra, 2010). In this article, I follow the more restrictive definition suggested by ECLAC (2006, p. 63), which considers 'trans-latins' as emerging Latin American transnational firms that have made direct investments outside their home countries.
4. MERCOSUR (Common Market of the South) was created in 1991 when Argentina, Brazil, Paraguay, and Uruguay signed the Treaty of Asunción, establishing the free movement of goods, services, and factors of production between countries.
5. The term 'internationalization' of firms adopted throughout the article refers to the development of international operations, basically investment in foreign countries.
6. Soya oil was originally developed with US state subsidies to supply the margarine industry. After World War II it became more important as a joint product of soya meal for the intensive livestock industry. With the Soviet purchases of the early 1970s, prices soared and the US government feared domestic shortages, placing a temporary embargo on soybean exports. Brazil and Argentina cut into world exports (Friedmann, 1992).
7. The income from agricultural export taxes (mainly from soybeans) has oscillated between 13% and 6% of total state income in the 2008–2014 period (<http://www.mecon.gov.ar/sip/>).

8. Nidera bought Asgrow Argentina in 1988 and began its activity as Nidera Seeds. Asgrow International had access to Monsanto's technology through an agreement between the two companies secured in the United States in the late 1980s (Brieva, 2006).
9. Despite these factors, over the past decade TNCs have developed a greater interest in the Argentine soybean seed market, a process that is linked to the possibility of changes in the regulatory context such as a shift to a much stricter intellectual property regime.
10. The Cerrado biome is located in the central part of the country and covers approximately 204 million hectares (or 24% of Brazil's entire land area). An estimated 40–50% of the Cerrado is under productive use, and by 2008 accounted for 59% of Brazil's coffee production, 55% of its beef, 54% of its soybean, 28% of its corn, and 18% of its rice (Trigo, Cap, Malach, & Villareal, 2009).
11. Seed companies favour changes in the Argentinian legal framework to ensure the recovery of intellectual property rights, thus restricting the right to save seeds to certain categories of farmers. In 2003 a state initiative intended to adopt a new law to govern the production and sale of seeds did not succeed, but a new attempt in this direction began in 2012, after the approval of a second generation of transgenic seeds with stacked traits. Some seed companies have also entered into private contracts with producers that allow them to collect extended royalties for farm-saved seeds. However, the system has limited coverage due to the resistance of Argentinian producers' organizations (Filomeno, 2013). According to a seed firm representative, 38% of the seeds sown in Argentina have recognized intellectual property rights to them (considering the sale of both certified seeds and royalty payments). In Brazil, this reaches 60%; in Uruguay, 100%; in Bolivia, 65%; and in Paraguay, 40%.
12. This type of arrangement implies that the tenant gives the landowner a percentage of the crop harvested instead of a cash payment in advance.
13. Soybean varieties are classified for their morphological growth habit, and for their day length and temperature requirement to initiate floral or reproductive development. A short-cycle variety matures in 90 to 100 days, which is two to three weeks earlier than the traditional varieties, allowing farmers to plant a second crop after the soybeans are harvested.
14. These facilities are already undertaking 3,000,000 analyses per year, while in Argentina they can only process about 300,000 samples annually.

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