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A Global Regime of Accumulation? Actors, Assemblages and Controversies in The Argentine Soybean Seed Industry

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A global regime of accumulation? Actors, assemblages and controversies in the Argentine soybean seed industry

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1. Introduction

In the Southern Cone of the Americas, the widespread adoption of modern biotechnology is one of the factors that led to the establishment of a socio-technical regime based on genetically modified (GM) soy. In fact, today most soybeans in the Southern Cone are produced through a technological package composed of GM seeds, direct seeding and glyphosate that has become the dominant form of production in the region. Regardless of its hegemony, an effort is required to understand the behavior of the actors that support this regime, the stability of the networks created, and their underlying tensions.

Some authors (Vara et al., 2012) argue that in the case of agricultural biotechnology, there is an active attempt to build a global regulation regime that allows a small number of transnational corporations based in the US and Europe to operate in multiple markets. In the same vein, Pellegrini (2011, 2013) argue that biotechnology is a globalized regime of genetic benefit where private oligopolies are the dominant actors, although there are differences in the procedures required in each country to deal with GM risks (Pellegrini, 2011, 2013). However, it should be noted that in the case of soybean, regulation refers to different domains: those related to the release of a genetically modified crop and the trading/consumption of the products obtained, and the IP (intellectual property) rights related to the access to seeds as the initial point of the production process. I will focus on the latter, an important, although limited part of the complex bundle of issues involved in soybean expansion.

Commodification of seeds is a relatively recent phenomenon in agriculture. As the trend towards commodification proceeds, the seed industry plays a significant role on the diversity of foods available, the environmental impact of crops, and the homogenization of cultural practices (Bonny, 2014; Hubert et al, 2013). It is also a fundamental link for reaching producers, not only through the seeds themselves, but as an articulating component of technological packages because of its connection with the agrochemical business.

The consolidation of the industry increases its influence on a whole range of issues at a global level. Referring to Argentina, Leguizamón (2016) states that frequent mergers, acquisitions, partnerships and joint ventures strengthen transnational seed and agrochemical companies' control of the soybean chain. Yet other perspectives (Delvenne et al, 2013) point to the lack of a market situation dominated by a monopoly of transnational companies, and of a hyper-restrictive system of intellectual property. In the view of these authors, the latter would contradict the hypothesis that a globalized privatization regime needs such conditions to take root in a country.

In this paper I will follow this thread, by examining the role of local actors -particularly local breeders- in current controversies regarding IP rights on seeds. In fact, in the case of Argentina GM soybean was introduced by domestic companies that develop varieties adapted to local climate and soil conditions. The existence of a strong and dynamic agricultural inputs and services sector has been depicted as a key enabling condition for the adoption of GM seeds (Newell, 2009). I argue that by focusing on local actors, a richer understanding of the networks that sustain the current socio-technical regime may be obtained. Specifically, this approach may allow us to: a) understand the role of these actors as drivers of technological change; b) identify some of the current controversies between different fractions of capital and c) how the latter are translated in the public arena.

Argentina represents a relevant case for the analysis since the area sown with glyphosate-tolerant soybeans increased from less than 5% of the total soybean planted area in 1996/7 to more than 90% in 2001/2. This rate of adoption was considered higher than the one reached in the United States, the first country to introduce this technology (Trigo and Cap 2003). According to Argenbio (2016) GM soybean reached 20,3 million hectares in the 2015/16 campaign, a figure that represents nearly 100% of an estimated area of 20,6 million hectares with this crop. Today, the soybean area covers 55% of the farmed land in Argentina, and the country ranks as the third producer worldwide.

For this purpose, I begin with a brief analysis of the mechanisms of accumulation currently employed by the seed industry, which have evolved from the input itself to the collection of royalties through the implementation of complex legal arrangements. Then I present an overview of the soybean seed industry in Argentina. In the fourth and fifth sections of the paper I explore inter-capital controversies and conflicts with farmers, which have been triggered by the soybean seed issue but have implications that exceed this initial framing. In the final section I summarize the key contributions of the paper.

2. Accumulation mechanisms in the soybean seed industry

According to Kloppenburg (2004) the private seed sector deployed different mechanisms towards the goal of commodifying the seeds: Technical means of hybridization, wherein the farmer was no longer able to reproduce his own seed; and legal/political means of intellectual property protection. In soybean, self-reproducibility implies the transmission of genetic traits between generations and enables farmers to replant seeds obtained from their own harvests. As attempts to pursue technologies of use restriction (e.g. “terminator” or infertile seeds) were frontally resisted by civic society organizations and governments of developing countries (Sztulwark and Braude, 2010) legal restrictions turned into the preferred means to capture benefits on the part of the seed industry.

Legal mechanisms that regulate access to seeds are complex, and currently involve different regulations. At the global level a milestone was established by the International Convention for the Protection of New Varieties of Plants (UPOV).[1] The 1978 UPOV Act prevents third parties to produce, reproduce or sell varieties that meet requirements of

[1] These *sui generis* rights over plant varieties developed in Europe in the 1950s to provide pseudo-patent rights for plant breeders. The objective was to create an effective system for protecting plant varieties that would be different from the industrial patent system (Wilkinson and Castelli, 2000).

distinctness, uniformity and stability without authorization from the breeder. It established two provisions: the *breeder's exemption,* which preserves the possibility of using a protected variety as an initial source to generate and commercialize new plant varieties, and the farmers' right to save seeds (known as the *farmers' privilege*). In 1991, the protection term was amplified from a minimum of 15 to 20 years, and the scope was extended to the multiplication of seeds. The breeder's right was prolonged to essentially derived varieties. Countries were also authorized to establish their own rules regarding the farmers' privilege (Table 1). Since the prohibition of double protection is not mentioned, the right on the variety can be supplemented with a patent protection (Fuck et al., 2008; Salles-Filho et al., 2011).

Table 1. Comparison between UPOV 1978 and UPOV 1991

Provisions	UPOV 1978	UPOV 1991
Protection coverage	National definition about which species can be protected	Plant varieties of all genera and species
Requirements	Distinctness Uniformity Stability	Novelty Distinctness Uniformity Stability
Protection term	Min. 15 years	Min. 20 years
Protection scope	Commercial use of reproductivematerial of the variety	Commercial use of all material of the variety
Breeder's exemption	Yes	Not for essentially derived varieties
Farmer's privilege	Yes	Countries are free to define their rules
Prohibition of double protection	Species eligible for Plant Breeder's Rights cannot be patented	No mention

Source: Fuck et al., 2008

A good deal of countries has adopted UPOV 1991, a process related with the expansion of global trade agreements.[2] Some countries have also established patent systems for plants and genes (Bianco, 2015). In the United States, patents can be issued for all seeds, plants, plant parts, plant genes and tissue cultures. Patent holders can decide whether or not to authorize protected materials for research. According to Howard (2015) the United States is the leader in setting new intellectual property precedents for seeds, which are then followed by other nations.

In countries that adhere to UPOV 1978, other alternatives have been fostered by the seed industry. This is the case of compulsory private contracts (license use agreements) by which farmers agree to pay royalties on saved seeds. The main focus of transnational

[2] The protection of plant varieties is a mandatory obligation for countries who are members of the World Trade Organization (WTO). They are obliged to implement the provisions of the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS Agreement). Article 27.3(b) of the TRIPS Agreement requires members to protect plant varieties by patents or sui generis protection or by a combination of both. Since the commencement of the TRIPS Agreement in 1995, most countries have tended to adopt the 1991 Act of UPOV. Accession under the 1978 Act ended in April 1999, after which membership of UPOV had to be based on the 1991 Act (Salles-Filho et al., 2011).

seed companies has been the farmer's privilege, to be able to maximize the appropriation of economic returns from their R&D investments (Filomeno, 2013).

With these restrictions, the practice of saving seed has been diminishing over time. The seed commodification process has catalyzed significant changes in the industry, especially corporate consolidation and the displacement of public institutions as the dominant actors in crop variety development (Luby et al., 2015). Regarding farmers, seed commodification fosters class differentiation (Wield et al., 2010). Pechlaner (2010) points to a more fundamental issue: the expropriation of farmers' control over the production process. She refers to *appropriationism* —the replacement of elements of the production process with industrial ones — and *substitutionism* — the replacement of agricultural end products with industrial ones — developed by Goodman, Sorj, and Wilkinson (1987), and proposes the concept of *expropiacionism* to describe an emerging accumulation strategy based in the network of legal mechanisms associated to the new technologies, that includes patents and other arrangements, such as private contracts.

This accumulation strategy implies that *in practice,* two different types of rent exist: the primary one, which is embodied in the input itself (the seeds), and the secondary, that involves the royalties collected on saved seeds. In certain cases, the second may be more important than the first. However, its mere existence may also help to amplify the benefits captured by the seed industry in the input market, since there is a growing evidence that restrictions on saving seed led to an increase in prices. IP rights are also cumulative: Arza (2014) refers to the ability of Monsanto of using its capacity to upgrade GM cotton technology as a negotiation tool to persuade local actors to change the rules that affected its multi-lines of business. IP rights may also overlap in the same input, and include separate royalties for different biotech traits and for the germplasm.

Accumulation strategies proceed not only through farmers' acquisition of seeds and the fees collected through saved seeds, but all along this industry. Licensing traits and varieties to other parties have turned into an important source of income for seed firms.[3] IP rights are also used to support the links among partners in developing joint projects (Salles-Filho et al., 2011).

Notwithstanding the attempts to build a global IP regime, a good deal of norms regarding access to seeds still relies on the national sphere. This implies that global firms must coerce or negotiate with local actors when seeking changes in legislation. Applications for patents must also be conducted at the local level.[4] The importance of national regulations points to the role played by national states in the construction of a standardized global space for the operation of firms and markets (Sassen, 2008). Throughout this process, a new type of territoriality emerges assembled out of national and global components, and new problematic situations and disputes may arise. This brings about an interesting area of inquiry, and suggests that the national state is a central focus for strategic politics (Motta, 2016).

[3] An estimation made by the author based on the financial statement of a leading Argentine firm indicates that the income produced by this item accounted for 26% of the firm's turnover in 2013.

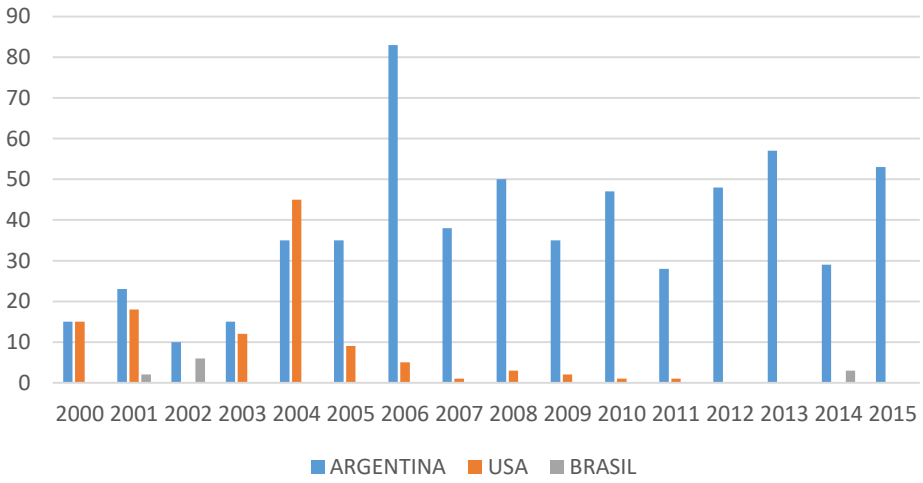
[4] Of course, there are other possible strategies that can be adopted by seed firms to capture the benefits arising from innovations, such as setting a high price in the first period of commercialization of a new GM seed, and reducing the price in subsequent periods (Monteiro and Zylsbersztajn, 2013).

3. Agents in the Argentine soybean seed sector. An overview

In Argentina seed production is a dynamic, labor-demanding activity (particularly of seasonal work) involving about 600,000 hectares. The country is the Southern Cone leading producer of seeds in counter season, and about 30% of production is exported (ASA, 2013). The most important items are corn and soybean seeds; the latter ranked first in the 2010-2012 period, with an average of 40,700 tons exported annually (INASE, 2014). In correspondence with the dynamism of the crop, soybean leads the list of varieties registered in the Argentine Register of the Property of Cultivars.

Local research in soybean began systematically in the 60s (Jacobs and Gutierrez, 1985). It consisted of testing the adaptation of varieties coming from the United States and Brazil to local conditions. It was carried out by state agencies (the National Agricultural Technology Institute) and national companies as OFPEC. Most of the latter began working with American firms, which provided germplasm for testing in Argentina and in the United States, allowing to shorten the time to develop varieties (Rossi, 2006). As time passed local firms developed their own breeding programs. Today, the Argentine soybean market is supplied almost entirely with local genetics (Figure 1).

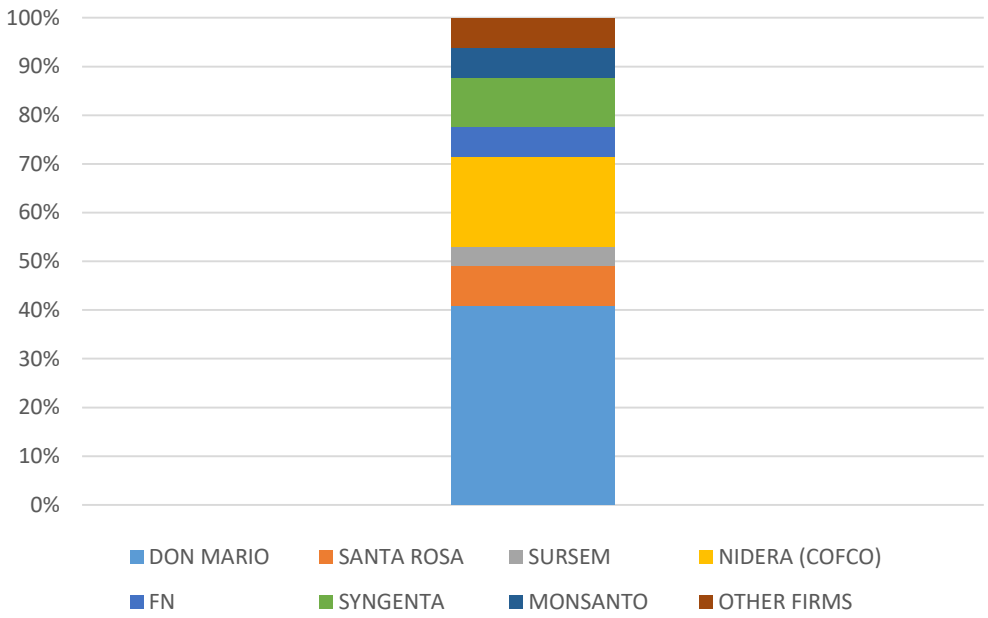
Figure 1. Origin of registered soybean varieties



Source: The author, based in the National Register of the Property of Cultivars

As for the public sector, it lost participation in research, a situation that is consistent with global trends in the seed industry towards concentration and privatization of knowledge (Fuglie et al., 2011). Although private firms became dominant in the development of new varieties of soybean seeds in Argentina, national companies (Don Mario, Santa Rosa, and Sursem to a certain extent) hold an important role (Figure 2).

Figure 2. Firm participation in soybean varieties registered in 2015



Source: The author, based on the National Register of the Property of Cultivars

According to a key informant of the public sector, two firms control 90% of the Argentine soybean seed market today: Don Mario, a firm of Argentine origin, and Nidera, originally a Dutch company, which recently was acquired by the Chinese conglomerate COFCO. Along with these firms there are others whose market share is considerably lower.[5] These breeding firms have agreements with biotech companies in order to insert the biotech traits into their varieties.

In addition, other types of agents are involved in the production of the seeds that are sold to farmers. The latter involves their multiplication and processing (drying, cleaning, sorting, chemical treatment and bagging), storage and marketing (Anllo et al., 2011). The complexity of the resulting network is revealed by the fact that each of the main breeding companies establish links with about 80 to 150 multipliers.

Together with a steady growth in the local market, several Argentine breeder firms began a path of internationalization in the 2000s. Although some of them reach South Africa, the United States and some European countries, the Southern Cone of the Americas is their main focus of expansion. The latter represents a market of special interest, not only because of the growth potential of the soybean area (particularly in the Brazilian Cerrado), but also because of the characteristics of the legal framework, which differs from the one prevailing in Argentina. The latter leads to the theme I will develop in the following section.

[5] There are seventeen improvement programs of soybean varieties at work in Argentina (Infocampo, 12-20th June 2015). Three of them were carried out by public entities (the National Institute for Agricultural Technology, the Agricultural Experimental Station Obispo Colombres, the National University of Entre Ríos) and eight by local firms. The remaining research programs belong to multinational companies and a firm controlled by an investment fund that includes local partners.

4. The IP regime as a locus of controversies in the Argentine soybean industry

The fact that multinational firms did not show great interest in the development of soybean varieties in Argentina could be linked to the existing regulatory framework, which conditions the appropriation of returns by the industry. Argentina enacted a seed law in 1973 (Nº 20247), and adheres to the 1978 UPOV Act by Law Nº 24376 that provides the possibility of saving seeds by the farmer for own use, and the free use of varieties for plant breeding. The patent law Nº 24481 and its regulatory decree 260/96 excludes plants and animals from patenting; it is only possible to patent microorganisms and the biological processes for their production.

The characteristics of the prevailing legal framework, which some authors define as "weak" (Monteiro and Zylbersztajn, 2011) may explain the current size of the soybean seed market. According to some estimates, 20% of soybean seeds planted annually are purchased from authorized dealers, 30% are saved seeds, while 50% would be acquired outside the legal circuit (Yankelevich, 2015). Some farmers pay royalties for own use seeds through contracts of "extended royalties" that have been promoted by the seed industry since 1999-2000. However, the system is not contemplated by current legislation and is resisted by most farmers.[6]

On the other hand, it could be argued that the regulatory framework, together with the conditions under which the glyphosate-resistant gene was released in Argentina[7], not only led to a lower interest of large biotech firms in the development of soybean varieties, but also facilitated the growth of domestic enterprises. Some authors argue that the impact of germplasm improvement on the increase of productivity exceeds the contribution of genetic engineering, which only allows lower production costs (Marin et al. 2014).

Some indicators point, however, to a possible reconfiguration of the soybean seed industry in the coming years. Leading TNCs have bought small breeding firms and have begun or resumed research in soybean varieties.[8] This strategy goes together with consistent actions carried out by the seed industry to introduce changes in the current regulatory framework facilitating a greater appropriation of the returns arising from innovations.

In fact, a state initiative towards changing the seed law took place in 2003-04 but was abandoned due to a lack of consensus.[9] In this conjuncture Monsanto decided to discontinue its soybean breeding program in Argentina, expressing its dissatisfaction with the seed regulatory system. The decision was widely seen as an attempt to press

[6] The system is supervised by ARPOV (Argentine Association for the Protection of New Varieties of Plants), an organization linked to the Argentine Seed Association.

[7] Nidera bought in 1998 the soybean breeding program of Asgrow in Argentina, and began its activity in the seed sector as Nidera Semillas. In the 90s it was the first company to launch the glyphosate-resistant soybeans. The parent company Asgrow International had accessed to Monsanto's technology through an agreement between the two companies in the late eighties in the United States. When Monsanto tried to patent the gene in Argentina it was not allowed to do so because Nidera had "liberated" it. (Brieva, 2006). According to different sources, the rest of the seed companies that developed transgenic soybean varieties established agreements with Monsanto. Those who did not were unable to continue in the market with a conventional varieties portfolio.

[8] This is the case of SPS, bought by Syngenta (acquired in 2016 by ChinaChem), La Tijereta, bought by Monsanto, and FN Semillas, bought by Bayer. (El Cronista, 23/08/2013; Infocampo, 14 al 20/3/2014)

[9] A reform of the seed law whose central axes were the adherence to the 1991 UPOV Act and the implementation of "global royalties" was promoted by the Secretary of Agriculture. According to Ceverio et al. (2008) the seed industry did not support the changes proposed by the state, fearing that the fees to be collected would be assigned to a state-controlled fund.

Argentina's government into passing more stringent laws (Delvenne et al. 2013). The corporation also sent a letter to 20,000 rural producers confirming its decision to implement a private system of royalty collection, and presented demands in importing countries of Argentina soybeans, albeit unsuccessfully (Filomeno, 2013).

A new attempt to modify the regulatory framework began in 2012 after a second generation of RR seeds (commercially known as Intacta[10]) was approved. The Ministry of Agriculture expressed his commitment to promote a new seed law. Monsanto also resumed its soy breeding program in Argentina, emphasizing that the context had changed thanks to the agreements reached with key actors of the soybean chain: "*We are launching the Intacta technology in Brazil and we have made the decision to make progress in Argentina, because we are achieving the consensus that we sought so long (...) with breeders, biotechnology companies, intermediaries, exporters, grain stock exchanges, the whole chain (...) that accepted the conditions to bring the technology"*. (Vice-president of the Argentina subsidiary, Infocampo, 22 to 28/06/2012).

In 2011, and before introducing Intacta in the country, the firm developed a private agreement with farmers ("letter of intention") that limited their rights in a whole range of aspects: By signing, farmers committed to purchase seeds from Monsanto or authorized licensees; to commercialize grains obtained with exporters or grain elevators participating in the system; to pay the corresponding royalties for each use of such technologies upon the purchase of seed bags, or upon statement and planting of seeds for own use, or upon the delivery of such grains to the exporter or grain elevator; to locate geographically the plots with the crop. Exporters participating in the system would evaluate the presence of the technology in the grains they received, while Monsanto was entitled to make inspections in the farmer's field and sample taking. In the event that royalties had not been paid before delivering the grains to the exporter/grain elevator, the amount due for royalties should be received by such participant and sent to the supplier of the technology (Yankelevich, 2014).

On the other hand, the whole marketing system changed, since when acquiring the seed, the farmer must sign a contract with the breeder of the soybean variety and another with the biotech firm. The amount of royalties increased, to include two types of fees (for the germplasm and for the transgenic trait). Yet the system was resisted by producers, and implied a low sale of the new generation of transgenic seeds.

Regarding the seed industry, the latter impacted on the financial position of the breeding companies that had inserted these traits into their varieties, and on their networks of seed multipliers. The new commercialization strategy also strengthened the power of the biotech corporation to control the whole chain, and led to explicit and previously unknown disagreements: *How can it be that a gene, a trait which ultimately brings 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 when sales began* (Author's interview, representative of a leading local breeder, 2014).

In this new context, the narrative that stacked events bring about higher yields started to be questioned. Local firms that kept part of their breeding programs on non-GM background also decided to strengthen this line of research, since it gives them more autonomy and flexibility to introduce new traits: *We have conventional varieties that are those that existed before the traits appeared (...) it is a very strong program, because it enables us that if a new biotechnology comes out, we insert it there, because often biotech companies do not have agreements between them* (Author's interview, 2014).

[10] These are seeds with stacked traits that confer glyphosate resistance and protection against BT insects.

The paradox is that the development of new biotech traits could lead to better availability of resources on non-GM elite lines (Milanesi, 2013). In the last years there has been a greater interest in the cultivation of non-GM seeds, because of the increase in weed control costs due to roundup tolerant weeds and the high cost of GM seeds. According to a firm's representative [*research in conventional varieties*] *now starts to be more valuable because there are resistant weeds; RR no longer has the same value* (Author's interview, 2014). Yields of GM seeds could also be diminishing due to a narrower germplasm base.[11]

5. Actor assemblages and discourses on changes in the local IP regime

Broadly speaking, today there are two types of controversies regarding the IP regime: one is related to the distribution of benefits within the seed industry (breeders and biotech companies), and the other, to farmers' use of saved seeds from their own harvests. Both should be analyzed separately, as they involve different issues. I will play attention to the framing of these disputes and the countervailing strategies adopted by local actors, taking into account that in the politics of regulatory regimes framing is particularly important. It involves creating a norm framework to interpret a problem in accordance with the perspective of the interest group, disseminating it to key players and establishing a link between the group's position and the public interest, so as to get widespread support (Newell, 2009; Filomeno, 2013).

To solve their objections to the existing system of distribution of benefits within the seed industry, local firms that develop soybean varieties support the idea of introducing changes in the seed law. They hope that the latter will strengthen their position regarding biotech firms: *We are hopeful that the legal framework will help us to a fairer debate between germplasm and biotechnology, because the value added by germplasm is very high. Each year we generate 2 to 3% of incremental productivity and that has to be valued, and be fair the value shared between biotechnology and germplasm,* stated a firm's representative in a local newspaper (El Tribuno,14/10/2014). These actors support a stricter IP regime, although they are aware that it may also impact negatively on them because it could involve the need of requiring the authorization of third parties to use existing varieties for research.

Their position is indirectly supported by researchers who argue that there are asymmetric levels of protection for transgenic seeds and the seeds obtained through non-transgenic methods. They argue that the mere insertion of a trait in an existing variety allows the seed to be defined as a novel variety, which could then be marketed without the original license holder's agreement (Marin et al. 2014). Other actors who support the need of local research in new transgenic traits also claim the importance of a stricter IP regime more able to ensure royalties to technology developers (Delvenne et al., 2013).[12]

[11] In Argentina the breeding of conventional varieties is pursued by public institutions (the National University of Entre Ríos) and private firms. One of the latter has created a firm that presents itself as the leading exporter of non-transgenic soybeans of the country. It proposes a contract farming system to producers, whereby the firm controls the chain from the seed to the beans exported, ensuring their traceability. Prices paid to producers are higher than in the case of GM soybeans.

[12] Support to biotechnology is firmly rooted in the Ministry of Science and Technology and the Ministry of Agroindustry, and has been sustained over time despite changes in political administrations. The Office of Biotechnology of the Secretary of Agriculture developed a ten-year Strategic Plan that reaffirmed a critical role for biotechnology as the main source of technological solutions for agricultural productivity growth in the country. Newell (2009) presents evidence supporting that 'bio-hegemony' has been produced and sustained by an alliance of interests which includes powerful agribusiness producers and traders, export-oriented elements of national Argentine capital, multinational biotechnology firms, and supportive elements within the Argentine state itself.

Yet a related framing of the subject is found in the dispute regarding farmers' access to seeds. In this case local breeders and biotech companies merge their interests in a common position. The organization to which they belong (the Argentine Seed Association) promotes the restriction of the right to save seeds for own use to certain categories of farmers. For the rest, the organization proposes the figure of "onerous" own use. It considers that the current framework leads to illegality, does not stimulate the development of innovations in self-pollinated species, and affects the competitiveness of firms that do not have hybrids in their market portfolio. It also argues that a high percentage of R&D efforts in soybeans are being submitted for marketing approval in other countries that have regulatory systems that recognize intellectual property (ASA, 2013). Thus, the fear of Argentina "lagging behind" is used as a means of legitimation of the need of changes in the seed law.

This perspective is rejected by most organizations of rural producers. The effectiveness of the latter in resisting changes to the farmer's privilege to save seeds has been previously acknowledged (Filomeno, 2013). The Argentine case would differ from the reality of Brazil and Paraguay where Monsanto succeeded in the early 2000s in implementing a private mechanism of royalty collection for RR soybeans that virtually eliminated the right of rural producers to freely save seeds. In those countries, soy growers accepted the system fearing that their exports could be confiscated.[13]

Controversies regarding the IP regime have not been settled, and indeed have increased. In 2015, Monsanto succeeded in adding a clause in soybean sale contracts which enables the *automatic* collection of royalties, in case of detecting the Intacta traits in the grains delivered by the farmers. The issue has been resisted by several organizations of producers, cooperatives and intermediaries. However, a new government took office by the end of 2015 in Argentina, and the IP regime could change, strengthening the position of the seed industry.[14]

Divisions also emerged among the most powerful rural organizations, with one of them - CONINAGRO, an organization that represents cooperatives of small and medium-sized rural producers- accepting the implementation of the information system that allows to detect the Intacta technology in soybean grains (La Nación, 3/06/2016). FAA, which previously rejected farmers paying for planting for "own use" seeds has recently softened its position, accepting that only small farmers are excluded (La Nación, 20/8/2016). Resistance to changes in the seed law is sustained by peasant organizations aligned with Via Campesina, which warn about the risks involved in the privatization of seeds and struggle for a greater visibility in the public space.

[13] According to Filomeno, the success of Argentine organizations was related to the framing of the issue in terms of public interest. He also emphasizes the appeal to technological sovereignty and to the role of the state in the generation of technologies made by FAA (Argentine Agrarian Federation), the leading organization of small and medium-sized producers in the country. However, the socio-technical regime based on GM soy is not questioned by this organization.

[14] Resistance of producer organizations and trading houses ("acopiadores") brought about an alternative system called "Bolsatech", to be managed by the Buenos Aires Grain Stock Exchange. In case of detecting the presence of Intacta seeds, the entity would send certificates to the farmer and to Monsanto, so it could proceed to collect the royalties (La Nación, 19/3/ 2016). The seed industry expected that the system would be operational in 2016, but its implementation was resisted by most producer organizations and objected by the Ministry of Agroindustry that indicated that the systems used for grain analysis should be officially authorized (Resolution 140/2016). After different instances that involved a meeting between Monsanto's CEO and Argentine authorities, the State established mandatory sampling (Res. 207/16). While the responsibility of the system lies in an official body (INASE), it is managed by the Buenos Aires Grain Stock Exchange. These measures were considered a transitional solution for the 2015/2016 campaign. Authorities expressed their commitment to make changes to the seed law, and presented a project to Congress in October 2016, which is currently being discussed. It restricts the farmers' privilege to save seeds to farmers registered in the National Register of Family Farmers, native peoples, and small producers.

In the press, the issue is frequently framed as impacting on Argentina's access to cutting-edge technologies. Attempts to reform the Argentine seed law are legitimized in terms of a necessary step to sustain innovation and to strengthen the position of the country as a global food supplier (Clarín, 10/03/2016 and 17/06/2016). The contribution to food sovereignty of the proposed changes in the IP regime has also been sustained by the seed industry (ASA, 27/10/2012).

These framings of the issue set aside that with the proposed changes in the IP regime the more general right of farmers to freely save seeds will cease to be recognized, not only in soybean but in all crops, and a new step towards commodification of seeds will be taken. In fact, saving seed minimizes dependence on commercial suppliers and helps farmers to control their production processes. It ensures that seed prices remain affordable, and helps to maintain food security (Mascarenhas and Busch, 2006).

On the other hand, the changes could also have consequences in IP controversies in neighboring countries: Press accounts mention that Brazilian producers follow how the dispute is finally settled in Argentina (La Nación, 27/06/2016).

6. Final remarks

In this paper I described the different agents that participate in the Argentine soybean seed industry, their accumulation strategies and the controversies that the latter bring about with farmers and within the industry itself.

The sector includes multinational corporations and firms of national capital. Up to now there has been a kind of "division of labor" between them ((Lengyel and Bottini, 2010) whereby the first provide transgenic traits and the second, the varieties that incorporate them.

Despite their relatively weak position regarding multinational corporations, national firms have access to multiple resources, which they deploy for influencing public debates. Among them, their knowledge of the local environment, their relationships with private and public organizations, and some kind of symbolic capital derived from their local origin. In fact, their national character serves as a source of legitimation of their interests in the public arena.

Regardless of their origin, seed firms' accumulation strategies are aimed to two different types of rent: those embodied in the input itself and the royalties that can be collected on farmers' own use seeds. The latter may also help to amplify the benefits captured in the input market, since there is evidence that restrictions in seed saving led to an increase in seed prices. IP rights are also cumulative and may also overlap in the same input.

Beyond inter-capital conflicts associated to the different capacity of breeders and biotech firms to appropriate the benefits arising from innovations, seed firms merge their interests in the dispute on the right of farmers to save seeds. Up to now changes have been resisted by rural organizations in Argentina, although lately some of them have moved away from a substantive position to a more limited dispute framed on distributional terms -that is, which type of producers should pay and to what degree.

Controversies on the seed law emerged years after the first GM soybeans were approved in Argentina. In fact, the content of the law and the rights it contemplated were

not objected when the new technology was disseminated, and probably was functional to the rapid growth of the GM soybean area in the Southern Cone of the Americas.

Controversies experienced different stages, but gained new impetus with the introduction of a new generation of GM seeds. Recent disputes take place in a different context with the election of a new, pro-market administration in Argentina.

Notwithstanding the attempts to build a global IP regime, seed regulations rely on the national sphere, leaving space for political negotiation/contestation. The redefinition of the GM socio-technical regime needs a narrative in terms of public interest that transcends the frame of soybean production. Arguments oriented to support access to own seeds faces limits in the case of soybean, because of the export and market-oriented nature of the crop, the importance of big or medium-sized farmers in production, and the social and environmental problems associated to soybean expansion. Yet it should be acknowledged that controversies go beyond soybean: farmers' rights regarding their access to seeds are affected.

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