

Agroholdings and Mega-farming: The evolution of farm networks in Argentina

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Summary:

Argentina is among the four largest producers of soybeans, sunflower, corn, wheat and sorghum, among other agricultural products. Since 1990's, due to several institutional innovations, farm production started to expand from traditionally vertically-integrated models towards new organizational forms. Unlike farming changes in Brazil, USA and FSU, dealing with high-scale vertically and horizontally integrated farming, in Argentina 60% of agriculture is done by contracts, through the use of different types of networks. These networks range from large-scale farming (20,000-350,000 has.) to medium and small-scale farming (3,000-20,000 has.). The evolution of the types and scales of these networks is deeply influenced by the institutional, organizational and technological environments. The questions that this paper proposes to this session are: a) why is it that in Argentina large-scale farming is predominantly done via contracts instead of vertical and horizontal integration?; b) how do these networks vary their scale of production, locations and strategies?; c) why have large-scale networks stalled or even declined in terms of area growth?; d) what can we expect in terms of evolution of different types of large-scale farming?; e) why have agricultural players in Argentina traded away control in order to gain flexibility when the opposite appears to happen in other agricultural sectors? This paper will attempt to provide researchers and managers with insights in terms of organizing agriculture production in Argentina by using contracts that could give both flexibility and control, especially in turbulent institutional environments, which are typical of emerging economies.

Key words: *hybrid forms, networks, innovations, commodities, adaptation.*

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Introduction

In Argentina, farming traditionally took place in small and medium-sized family farms, mostly by means of their own land, labour, capital (financial, machinery, etc.) and entrepreneurship. Farmers owned enough equipment to cope with all required activities of the production cycle. This traditional family farm model is the dominant organizational form in agriculture in almost every country.

Since the 1990s, however, a new scenario has been introduced (Ordóñez and Nichols, 2003): The economy was deregulated and opened to globalization and free market policies were adopted –Convertibility law, which tied the Argentine peso to the US dollar; privatization of State-owned organizations; import tariff reduction–. Under this new scenario, the Argentine economy managed to achieve a degree of stability that created a business-friendly environment. In addition, the convertibility law with a fixed exchange rate fostered investments in imported machinery and cutting edge technology.

New organizational forms in agriculture emerged in this economic environment, which significantly changed the nature of relationships between agrifood system participants. Some agents specialized in custom agricultural services –such as seeding, spraying and harvesting– and invested in modern farming equipment and machinery. Some landowners or farmers without land also invested in modern machinery and leveraged their knowledge and resources on new leased lands thereby controlling larger farming operations. During the 1990s agricultural, while farming margins were being squeezed, an increase in production scale was necessary to reduce fixed and variable costs and geographic diversification helped mitigate production risks (mainly associated with climatic factors).

The 2001/2002 economic crisis in Argentina led the financial system to a halt and access to credit was reduced to almost zero. Institutional hazards resulted in fewer incentives for farmers to invest in fixed assets. In order to continue their farming operations, contractors and producers tinkered with new hybrid forms in which they incorporated “partners” who supplied the financial capital necessary for farming. These new hybrids blossomed during the 2002-2007 period when international commodity prices boomed and devaluation of the Argentine peso led, between 2002-2005, to relatively lower costs.

After this booming period, the institutional environment started to change once again with increased government intervention: Price controls, restrictions on export volumes, tax increases (especially those related to commodity exports) and tighter fiscal control. In addition, higher costs for farm inputs, energy, labour and freight started to squeeze margins since 2008, and hence there have been lower incentives for investors.

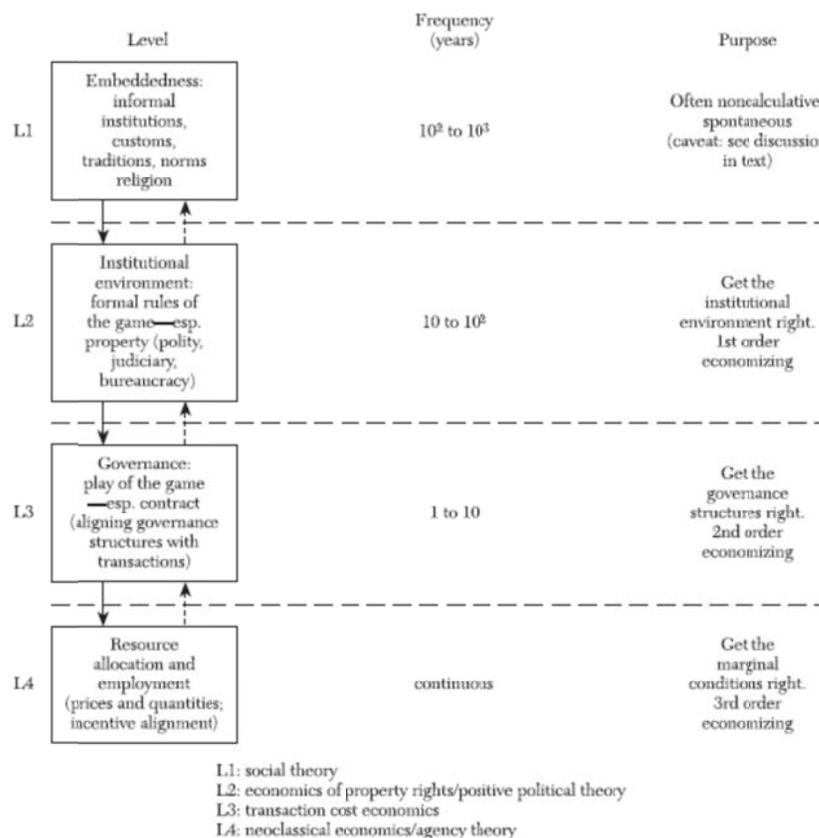
Since 2009, it grows sprees government intervention, macroeconomic policy begins to generate inflation in dollars and an exponential increase in production costs and tax occurs. At present, given the drop in the price of commodities, agricultural production contracts in Argentina is low or no profitability.

The objective of this paper is to provide researchers and managers with insights in terms of organizing agriculture production in Argentina by using contracts that could give both flexibility and control, especially in turbulent institutional environments, which are typical of emerging economies.

The paper is organized as follows. In the next two sessions, the authors outline the theoretical framework and methods used in the paper. Subsequently, the emergence and evolution of hybrid forms in three different periods with marked differences in their institutional environments is described. Then, the paper introduces a discussion on the interplay between the institutional, organizational and technological environments and how they affected agricultural production and productivity since 1990. The paper concludes with a brief summary and queries for future research.

1. Theoretical framework

The analysis of the recent evolution of the Argentine agricultural production sector is based on the new institutional economics (NIE) approach. In particular, the paper follows two NIE pathways introduced by Joskow (1995, 2004) and Williamson (2000): the institutional analysis and the governance structure analysis (Figure 1).



Source: Williamson (2000).

According to this model, the first level of institutional analysis is the social embeddedness level. “*This is where the norms, customs, mores, traditions, etc. are located*” (Williamson, 2000: 596). This has a strong relation with trust and compliance to agreements between agents. The second level encompasses the basic institutional environment or what Williamson calls ‘the formal rules of the game.’ “*At this level are defined constitutions, political systems and basic human rights; property rights and their allocation; laws, courts and related institutions to enforce political, human rights and property rights, money, basic financial institutions, and the government’s power to tax; laws and institutions governing migration, trade and foreign investment rules; and the political, legal and economic mechanisms that*

facilitate changes in the basic institutional environment” (Joskow, 2004:10). *“This opens up the opportunity for first-order economizing: get the formal rules of the game right”* (Williamson, 2000: 598).

According to North (1990), institutions matter especially when transaction costs are high. Following Kherallah and Kirsten (2001), it is important to study institutions inasmuch as their level [and the enforcement of current laws] influences economic growth and sustainable economic growth comes from important institutional changes. A fragile institutional environment often results in low levels of investments and technologies due to the uncertainty in appropriating value resulting from investments (North, 1990).

The third level of analysis is where the institutions of governance (or governance structures) are located. *“Although property remains important, a perfectly functioning legal system for defining contract laws and enforcing contracts is not contemplated... settlement action is dealt with directly by the parties through private ordering”* (Williamson, 2000: 599). Williamson (1991: 271) suggests that *“each viable form of governance –market, hybrid, and hierarchy– is defined by a syndrome of attributes that bear a supporting relation to one another.”* Williamson (1991) advances the hypothesis that each generic form of governance is supported by a different form of contract law; and that there are crucial differences between markets, hybrids and hierarchies in how they adapt to changing circumstances and in the use of incentive and administrative control instruments. *“Not only does transaction cost economics subscribe to the idea that the transaction is the basic unit of analysis, but governance is an effort to craft order, thereby to mitigate conflict and realize mutual gains”* (Williamson, 2000: 599).

In the transaction cost perspective, hybrid forms such as the farm production networks analysed in this study are characterized by *“semi-strong incentives, an intermediate degree of administrative apparatus, displays semi-strong adaptations of both kinds and works out of semi-legalistic contract law regime”* (Williamson, 1991: 281). Ménard (2004) argues that *“there is indeed a great diversity of agreements among legally autonomous entities doing business together, mutually adjusting with little help from the price system, and sharing or exchanging technologies, information and know-how, capital, products, and services, but without a unified ownership”* (Ménard, 2004: 348).

Ménard’s (2004) central proposition is that hybrid organizations form a “specific class” of governance structures, combining contractual agreements and administrative entities or “authorities,” with the purpose of coordinating partners’ efforts to generate rents from mutual dependence while controlling for the risks of opportunism. The necessity of expanding areas (in order to gain in scale and reduce costs) derived in new contracts by the farmers, reducing uncertainty. On the other hand, financial capital necessity (and availability of this capital but not in formal entities) also derived in new institutional arrangements (Coase, 1937), especially to enforce property rights.

2. Methodology

This study focuses on the interplay between analytic levels 2 and 3; in particular how changes at the institutional environment level in Argentina affect the design of governance structures by agents engaged in agriculture.

A qualitative and descriptive research approach is adopted to accommodate the complexity and multi-dimensionality of the research topic. The research has an explanatory level, taking into account that it seeks to develop and clarify concepts and ideas, with a view to formulating more precise problems or hypotheses that can be researched in further studies, besides having a less rigid planning, not applying quantitative techniques and being carried out with more practical concerns (Gil, 1994).

This paper uses phenomenological knowledge as its methodology for studying agribusiness, as recommended by various authors (e.g. Peterson, 2011; Yin, 1989; Bonoma, 1985). This study is designed using the discrete structural analysis approach –that is, a description of the evolution of the agricultural production sector in Argentina through the characterisation of its institutional, organisational and technological environments (Williamson, 1991; Zylbersztajn, 1996; 1999). The paper analyses the main institutional changes in Argentina for the periods 1990-2000, 2001-2007 and 2008-2012. Institutional (rules of law), organizational (players and governance structures adopted) and technological (inputs and processes) environment changes in each period are used to explain subsequent changes in production, productivity and investments in the agricultural production sector.

This paper relies on primary and secondary data for the analysis. Interviews with experts were conducted in 2009 and 2014. Industry experts include participants and managers of different hybrid forms and agribusiness consultants. Interviews with industry experts followed the same protocol based on a questionnaire with open-ended and closed-ended questions related to how the new organizational forms emerge, the importance of leadership, formality of contracts, incentives, business units, partners, financial issues, etc. The objective was to explain the emergence and evolution of hybrid forms. Secondary information, especially regarding institutional and technological innovations, was obtained from several sources including trade associations, university libraries and the Internet.

3. Economic Liberalization and The Birth of Hybrid Forms: 1990-2000

Until 1990, the agricultural production sector in Argentina was dominated by traditional family farms and farm production was primarily marketed in the domestic market. In order to describe the institutional environment till 1990, Ordóñez & Nichols (2003) explain:

“... From 1930 to 1991 Argentina alternated weak democracies with strong dictatorships, both political settings sharing a welfare state paradigm with strong state intervention, protectionism, weak rule of law, imports substitution, rampant inflation and hyperinflation...”

“... Nevertheless, with the first socialization of wealth during this period, the model ended with a poor output, low economic growth and low volume of foreign trade [...] The core issue in this paradigm was to allocate the Pampas’ productivity and rents to promote urban economy: export taxes on agribusiness output transferred a huge amount of resources to the State that were re-allocated to welfare policies, promoting the local industry for imports substitution. On the other hand, export taxes pushed down agribusiness prices, forcing cheap affordable food for the working class.”

This introduction has an explanation: With high levels of intervention in the economy and uncertainty, farmers had weak incentives to invest in technology, increase the scale of their

farming operations and develop different organizational forms. Agricultural production did not increase at a rapid rate during the period 1950-1990 and Argentina appeared to be left out of the “green revolution”.

Institutional changes were implemented in the early 1990s in order to move away from the high levels of inflation, unemployment and uncertainty of the previous decade. More specifically, the country embarked on dramatic economic liberalization policies that can be summarized as follows:

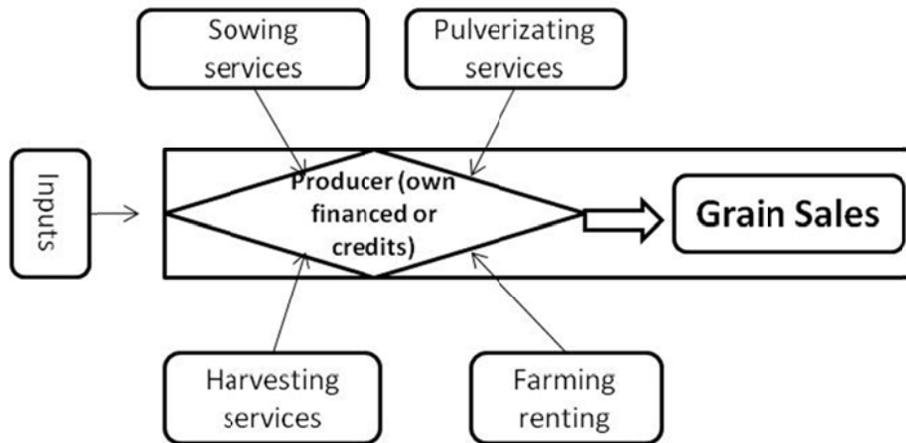
- Privatization of state-owned companies including port and river dredging, railways, oil companies, energy facilities, communications systems, highways and road systems, with subsequent increased private investments. As a result, the country’s basic infrastructure was upgraded resulting in lower costs of doing business.
- The enactment of the Convertibility Law (Law 23.928/1991) with the implementation of the currency board that linked the local peso to the US dollar (one peso-one dollar) resulted in a less volatile scenario in terms of inflation and exchange rate.
- Agricultural markets were also liberalized with the elimination of the grain and beef boards and reduction of State intervention.
- Elimination of export taxes for agricultural commodities and reduction of import tariffs on farm inputs (e.g. fertilizers, chemicals), which resulted in significant reduction of distortions between domestic and international prices.
- The enactment of the federal law protecting plant breeder’s rights, together with the creation of the CONABIA (Comisión Nacional Asesora de Biotecnología Agropecuaria – the Biotech Commission) and the INASE (Instituto Nacional de Semilla – the National Seed Institute), provided private firms with the necessary protection to develop and introduce new agricultural technologies in Argentina – in particular, new soybean transgenic events were approved.
- The regulation of the trust funds Law (fideicomiso), which enabled agricultural financing by using the stock exchange market.

Convertibility fixed the currency rate, and effectively nullified the risk of inflation. A more stable environment led farmers to invest in machinery with more producing capacity. On the other hand, input suppliers competition became higher. This situation, added to a more certain “business environment”, resulted in further relationships between different agents –farmers, land owners, service suppliers, input suppliers, etc.– and great incentives to gain in scale in order to reduce unitary costs, coupled with risk-reducing strategies, such as seeding in different regions.

This resulted in the emergence of complex hybrid forms in agricultural production, especially designed to benefit from economies of scale and scope and to take advantage of profitable investment opportunities in the agrifood sector. Consequently, the structure of farming enterprises in Argentina shifted from traditional family-owned resources to agricultural production based on contracts for specialized services, including land leasing contracts, seeding contracts, custom contracts for specific farming activities, harvesting contracts, marketing contracts, future markets contracts, crop insurance contracts, among others.

During this period, two basic hybrid forms emerged: a) informal hybrid form and b) network of networks. Informal hybrid forms basically consist of short-term contractual relations, mainly informal/verbal agreements, in which farmers participate in a number of transactions for services related to grain and oilseed production (land leases, production inputs, sowing services, weed and insect control, harvesting, commercialization and storage) (see Figure 2).

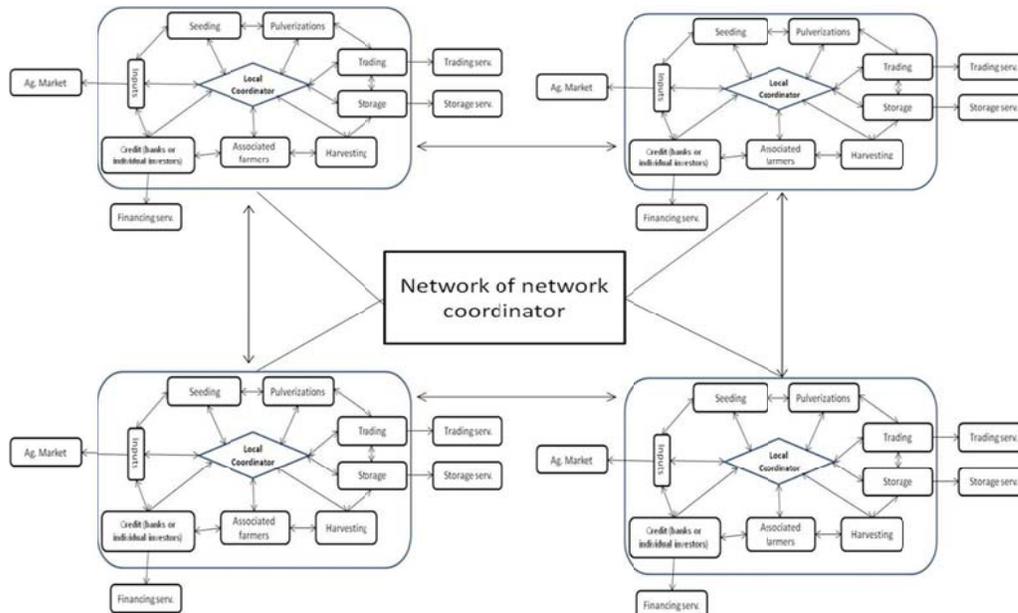
Figure 2. Informal hybrid forms



Source: own elaboration following interviews

The network of networks is based on a network of contracts with local partners with specific knowledge –called “contractors”–. Generally, the whole network is kept in a specific area of influence, but this model has been spread to other regions beyond traditional ones (Figure 3).

Figure 3. Network of network organization



Source: own elaboration following interviews

The coordinating node acts as a central planner, coordinating activities between different network peripheral nodes. Some of these networks have subsequently expanded to other neighbouring countries, including Brazil, Paraguay, Uruguay and Bolivia. The main characteristics and differences between informal networks and the network of networks are described in Table 1.

The common variable between both hybrid forms was the economy of scales. In the case of the informal hybrid form, higher scales implied the possibility of heavier use of machinery, thus amortizing the investment in a quicker fashion and gaining in bargaining power with suppliers and land owners. In the case of network of networks, the incentive was to spread and diversify farming area (reducing risk), reduce unitary costs and interact with different types of partners (not only contractors, but also storage service companies).

Table 1. Main characteristics of the informal hybrid form and network of networks

	Informal hybrid form	Network of networks
First appearance in Argentina	1990	1995
Contract type	Informal, relational	Both formal and informal (based on trust)
Contract duration	Short term (one-three years)	Short and long term (more than 5 years)
Actors involved	Farmers and service suppliers	Coordinator, land owners, service suppliers, banks, outside investors
Sources of finance	Farmer's own capital and credit from input suppliers	Internal and external, including banks, external investors and input suppliers
Average production area	1,000 to 5,000 hectares (owned and leased land)	20,000-350,000 hectares (mostly leased land)
Organizational uncertainty	Medium	Very low (importance of trust)
Leadership	Not really important	Very important (central coordinator and local managers)
Incentives	Low (due to the impossibility of long term contracts)	High (participants must fulfil agreements)
Relationship-specific assets	Low (know-how)	High (know-how, reputation of actors, technology)

Source: the authors, based on interviews and Chaddad et al. (2009).

Also during the 1990s the technological environment saw great innovations with the introduction of no-till farming practices, intensive use of fertilizers, agrochemicals and GM seeds. Moreover, industry players –such as transnational companies like ADM, Cargill, Bunge, Dreyfus, Nidera and some other domestic companies such as AGD and Vicentín– also made new investments in modern, large scale sunflower and soybean processing plants, resulting in higher processing capacity primarily destined for export markets.

4. Economic Crisis and Currency Devaluation: 2001-2007

The late 1990s witnessed significant economic turmoil in emerging economies culminating with the 1998 currency devaluation in Brazil, which significantly affected Argentina's competitiveness to export. By the beginning of the twenty-first century, Argentina had not recovered from Brazil's currency devaluation. The federal budget was in a deficit of about 2.5% of GDP. The government decided to raise tax rates and to adjust the convertibility system pegging the Argentine peso to a currency basket with a 50-50 combination of the dollar and the euro. Investors understood that this adjustment could lead toward currency devaluation. Short-term interest rates immediately jumped and a "silent run" on banks –with significant reduction in bank deposits– began in September 2001 (Saxton, 2003).

New and abrupt institutional changes occurred by the end of 2001. The president's demission, followed by a sequence of 5 presidents in 2 weeks, created a chaotic scenario. Debt payment to foreign and local bonds holders was suspended, characterizing a massive sovereign debt default. On January 1st 2002, Eduardo Duhalde assumed the presidency, determined to reverse free market policies –in particular the convertibility system (Saxton, 2003). Under the Law of Public Emergency and Reform of the Exchange Rate Regime of January 6, 2002 and related measures, the government:

- Ended the convertibility system, in effect confiscating \$14.5 billion in foreign reserves that, under the convertibility system, were held in trust for the Argentine people and other holders of pesos.
- Devalued the peso from the previous rate of 1 per dollar to 1.40 per dollar, and later floated the exchange rate, allowing further currency depreciation. The peso peaked at \$4 per dollar and stabilized at around \$3 per dollar.
- Forcibly converted bank deposits and loans denominated in US dollars into pesos (“pesification”). Deposits were converted at 1.40 pesos per dollar; loans, at 1 peso per dollar. Interest rates were frozen at pre-devaluation levels.
- Forcibly prolonged time deposits (the Spanish name for this measure is the *corralón*, or big corral, to distinguish it from the earlier *corralito*). Depositors were unable to freely access their bank accounts and cash withdrawal limits were set at A\$250 per week.
- “Pesified” contracts in dollars at 1 peso per dollar.
- Imposed exchange controls with restrictions on buying foreign currencies.
- Suspended bankruptcy proceedings.
- Established a variety of new taxes and regulations, such as export taxes on agricultural commodities and State controls on exports (similar to those implemented before the 1990s).

Schuler (2002) identified the most pressing problems to be addressed in order for the country to restore economic growth: The currency, the financial system and the tax system. Because economic agents did not trust the currency or the banking system, people were not conducting ordinary transactions such as buying, selling, saving and investing which are necessary to generate economic activity (Ordóñez and Nichols, 2003). On the other hand, funds for credits were almost nonexistent.

Despite this chaotic scenario, the agricultural system benefited from currency devaluation. However, by 2002 export taxes were implemented again for the major farm commodities¹. Because land and trade credit markets froze, financial constraints were widespread among agricultural producers and networks. Margins in agriculture became interesting not only for farmers or contractors, but also for outsiders –regular investors– that did not trust the banking system, which opened the door for agricultural production ventures to offer them investment opportunities. Additional organizational changes were required to allow outside investors to fund agricultural production enterprises, despite the uncertain institutional scenario.

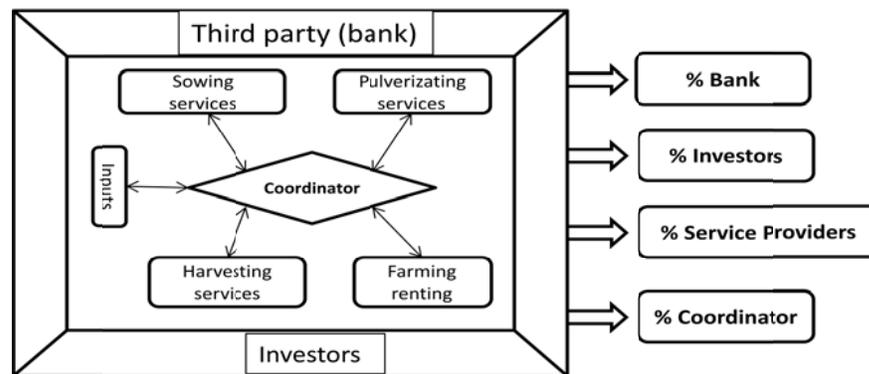
As a result, farmers and financial players developed more complex institutional arrangements and business relationships involving contractors, landowners, input suppliers, processors, exporters and outside investors (some with no previous experience in the sector). Contracts in

¹ By February 2002: Sunflower and Soybean: 13.5%; Wheat and Corn:10%.; by July 2002: Sunflower and Soybean 23.5%; Wheat and Corn: 20%.

agriculture provided the level of enforcement that was necessary to include new partners but also to expand and develop the sector.

Two organizational hybrid forms evolved and gained market participation following the 2001 crisis: c) “fideicomisos” or agricultural trust funds and d) investor-oriented hybrid forms. An agricultural trust fund is a contractual-legal figure enforced by National Law 24,441/1995 (Ley de Fideicomiso / Trust-Fund Law). This entity includes an investor and a group of actors linked to an investment capital receiver (the coordinator of the organization). There is, in turn, a third party (generally a financial institution) that guarantees that the coordinator fulfils contractual obligations to the other trust fund parties unquestionably (Figure 4).

Figure 4. Agricultural trust funds

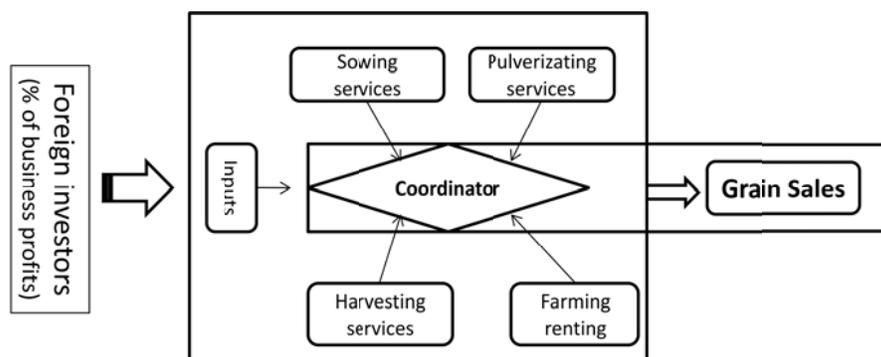


Source: own elaboration

following interviews

The investor-oriented hybrid form emerged as a mechanism to organize agricultural production using financial resources from several partners. Although often associated with common investment funds, investor-oriented corporate structures appear more private, between producing parties and investing parties (Figure 5).

Figure 5. Investor-oriented hybrid form



Source: own

elaboration following interviews

The main characteristics and differences of agricultural trust funds and investor-oriented hybrids are described in Table 2. The common variable between both hybrid forms was the

necessity of financial capital, so that to arrange transparent and enforced contracts that could incentivise investors to participate.

Table 2. Main characteristics of agricultural trust funds and investor-oriented hybrids

	Agricultural trust funds	Investor-oriented hybrids
First appearance in Argentina	Early 2000s	Late 1990s
Contract type	Formal	Formal and informal (friends and relatives are part of the business)
Contract duration	Short to medium term (one-three years)	Short term (one year)
Actors involved	Banks, lawyers, financial organizations, coordinator (administration company) of service and contracts with farmers, service and input suppliers	Coordinator of services-contracts-inputs, capital investors, lawyers, accountants
Sources of finance	Institutional and private investors	Ordinary external investors
Average production area	5,000-10,000 hectares (mainly leased land)	10,000-100,000 hectares (leased land)
Organizational uncertainty	Low	Low
Leadership	Medium	Low
Incentives	High	High
Relationship specific assets	Medium (know how, reputation of actors)	Medium (know how, reputation of actors)

Source: the authors, based on interviews and Chaddad et al. (2009)

Within the technological environment, there were also significant innovations between 2001 and 2007 with widespread implementation of no-till cropping systems, precision agriculture, intensive use of fertilizers, agrochemicals and genetically modified seeds in the major agricultural regions. The soybean and sunflower crushing capacity continued to expand during this period and so did agricultural commodity exports.

5. Increased Government Regulation and Uncertainty: 2007-2014

By the end of 2005, the national government started to regulate agricultural markets and placed restrictions on exports, particularly on bovine livestock (beef and dairy products) and subsequently on wheat. However, the agricultural sector did not suffer significant changes at the institutional level until 2007.

In 2007 and 2008 the international (CBOT) price of soybean –Argentina’s main agricultural product– exceeded US\$ 500 per ton. International commodity price increases led the government to establish significant changes in export taxes for all agricultural products with Resolution 125 in 2008. This Resolution included the implementation of variable export taxes on commodity exports, thus installing *de facto* maximum prices for farmers. For instance, when the price of soybean in CBOT was lower than 450 US\$/ton, the export tax stood at 35%; from that point on, export taxes would vary based on international prices: the higher the price in the Chicago Market, the higher the percentage of the export tax. After many protests and strong resistance from agricultural leaders, the resolution was sent to Congress, where the measure was annulled.

Despite the return to the 1980s export taxes policy and reduction of international commodity prices following the 2008 world financial crisis, interventionist measures on commodity markets continued –including restrictions on wheat and corn exports. Added to this, further institutional changes were the recently sanctioned National Forest Law and Labour Law, which have set clearer boundaries for deforestation and protection of natural forests on the one hand and new requirements for employers with heavy restrictions on temporary labour on the other. All these interventions on agriculture resulted in higher overall uncertainty and lower incentives for investment and also, lower participation from “outsiders” as financial partners. Companies, banks and individual investors decided not to continue investing in farming, or even reduce their level of investments, due to the higher institutional uncertainty.

During this period, the hybrid forms that continued in force were the network of networks and informal hybrid forms, shifting to short term contracts. The other hybrid forms decreased in importance as farming in the late 2000s did not offer sufficiently high returns given the exceedingly high levels of uncertainty, especially for outside investors.

Macroeconomic policy generated an increase in production costs (energy, labor costs, fuel, supplies, etc.) and tax about 40%. At the same time appear weeds resistant to glyphosate, which also generates an increase in the production cost.

Economic business margins are dwindling and the cost of management and administration in the Netchains begin to have a significant relative weight in the total cost structure.

Economic incentives for Netchains disappear and appear by default transaction costs because of a non compliance of contracts.

The drop in the price of commodities increases the problem. The high level of production is non longer a competitive advantage. The costs of controlling the contract system, in remote areas from the central node of production to maintain lower transaction costs, are so high that the activity does not become profitable.

At present, the Netchains have reduced their expansion, only to the most productive areas, reducing uncertainty and transaction costs.

6. Discussion

An analysis of the institutional, organizational and technological environments allowed us to understand the evolution of farming and agribusiness in Argentina during different periods. It is also important, however, to examine what happened during these periods from the point of view of agricultural production and investments.

During the first period of analysis (1990-2001) there was a constant growth in production due to both cultivated area growth and increases in productivity as a result of the intensive use of fertilizers and inputs and machinery, the use of GM seeds and higher expansion of cultivated area due to new organizational forms described. Institutional certainty, contracts, new business models, and technology availability permitted to enhance production and productivity. From the 2001 crisis to the 2003/04 season production remained fairly stable, especially because of institutional uncertainty and difficulties for farmers to access credit markets. However, production returned to a gradual growth mode until the 2007/08 season. Following the institutional changes in 2008, there was a very strong reduction of production

and productivity due to a reduction of the planted area and a severe drought in 2009, and an increase in soybean area.

Following this statement, there would be a strong relation between the level of institutional uncertainty and investments by agricultural players (see table 3). During 1990s, Convertibility and no export taxes generated a more certain environment resulting in investments in machinery (no till seeding), GMO and the use of fertilizers and agrochemicals in general. Moreover, during this period there were incentives to invest in crushing capacity, from 8.2 million tons in 1993 to 30 million in 2000.

The new organizational forms (with higher scales) emerged during this decade in order to take advantage of the higher capacity of machinery and to reduce costs (especially fixed costs). But the hybrid forms became possible because of the low institutional uncertainty and low transaction costs in terms of doing contracts between different agents. Following Coase statement, low uncertainty corresponded to incentives necessary to develop agriculture in Argentina, investing in new technology; but also, agents were willing to do business together due to lower transaction costs.

Despite the 2001/2002 political/financial crisis –with high level of macro transaction costs–, players had experiences on collective actions and the financial capital necessity opened the door to new players: Investors. Hence, the institutional arrangements (Coase, 1937) reduce transaction uncertainty, resulting in more investments, higher production and productivity, and expansion of agriculture to new regions.

Moreover, between 2004 and 2006, lower institutional uncertainty lead to new investments to expand processing capacity, which also involved improvements in storage and handling infrastructure (such as harbours and storage facilities).

However, new government interventions, higher costs and low prices, generated lower incentives for agriculture, area, production and productivity became stable and investors decided not to continue financing agribusiness activities. Moreover, some companies (especially those with higher scale) decided to reduce area (because of higher monitoring costs and renting costs) or even increase their participation in farming in other countries. Informal hybrid forms continued operating due to their flexibility, short term contracts and lower scales.

Table 3. Discussion of results: institutional environment, effects and organizational form

Characteristics	Hybrid forms				Institutional scenarios		
	Informal hybrid form	Network of networks	Investor-oriented hybrids	Agricultural trust fund			
Contract type	Informal (trust)	Formal & informal (trust)			1990-2000	Privatization Convertibility Law Market liberalization Elimination of export taxes Seed law Trust fund law	
Contract duration	Short	Short (landowners); Long (other network members)					
Incentives	Lower institutional uncertainty: higher incentives to gain scale	Lower institutional uncertainty: higher incentives to gain scale					
Contract type	Informal (trust)	Formal & informal (trust)	Formal & informal (trust)	Formal	2001-2007	End of convertibility Currency devaluation Pesification Corralón Exchange controls Reinstatement of export taxes	
Contract duration	Short	Short (landowners); Long (other network members)	Short	Short to medium term (one-three years)			
Incentives	Institutional uncertainty: higher economic incentives (higher margins due to currency devaluation)	Institutional uncertainty: higher economic incentives (higher margins due to currency devaluation)	Institutional uncertainty: higher economic incentives (higher margins due to currency devaluation)	Institutional uncertainty: higher economic incentives (higher margins due to currency devaluation)			
Contract type	Informal (trust)	Formal & informal (trust)	Formal			2007-2012	Variable export taxes Heavier market intervention Export restrictions New labour law National forest law
Contract duration	Short	Short & Medium (landowners); Long (other)	Short				
Incentives	Institutional uncertainty: lower economic incentives (lower margins due to government intervention)	Institutional uncertainty: lower economic incentives (lower margins due to government intervention)	Institutional uncertainty: lower economic incentives (lower margins due to government intervention)				

Source: the authors

7. Conclusions

In this paper the authors described and analyzed the evolution of the institutional, organizational and technological environments in Argentine agriculture since the 1990s. During this period, there were different institutional contexts, sometimes with clearer and more stable conditions and low levels of uncertainty, sometimes with higher intervention policies. The paper discussed how new organizations emerged during the different periods and scenarios, in a context of increased international demand for agricultural commodities.

Starting with organizational innovations of the 1990s, farmers, service providers and input suppliers developed complex contracting systems and networks in order to expand agricultural production. Following the Argentine economic crisis in 2001 and 2002, these actors also started to create alliances with other actors outside the formal agribusiness circuit (investors). Common people –and, to a lesser extent, banks and financial organizations– began to finance the agricultural sector. From 2008 up to nowadays Netchain participation in the agricultural business has decreased due to high production costs, high transaction costs and low commodity prices.

The description and interpretation of organizational adaptation in a context of institutional uncertainty informs why Argentina is in a unique position not only because of its natural resources, but also because of the capacity of the agrifood system participants to manage their businesses with different types of formal and informal contracts in turbulent institutional scenarios. These hybrid forms provided the institutional framework necessary to reduce transaction costs and build trust among agents in such fashion that contracts and exchange could continue to occur in a highly uncertain institutional environment.

The hybrid forms emerged to create order and enforce property rights among agrifood system participants, which in turn enabled them to benefit from the commodity cycle and profitable investment opportunities. Hybrid forms constitute autonomous specialized nodes that work in a coordinated fashion assisted by modern information and communication technologies, trust, a shared vision, and the capacity to coordinate different agricultural processes. These organizations are more competitive because they enjoy aligned incentives, flexibility, and adaptability.

As farmers continue to face new institutional and technological challenges, they will continue to tinker with alternative hybrid forms to reduce transaction costs of doing business in a fragile institutional environment.

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